The Magazine of

STANDARDS

Are Concrete Specifications Adequate? (*page 333*)

November 1955

The Magazine of
STANDARDS
Formerly Standardization

November 1955 Volume 26, No. 11

Published monthly by American Standards Association, Incorporated
70 East 45th Street, New York 17, N. Y.

OFFICERS

J. L. Cranwell, *President*
Vice Admiral G. F. Hussey, Jr, USN (Ret), *Managing Director and Secretary*
Cyril Ainsworth, *Technical Director and Assistant Secretary*
G. P. Paine, *Director of Public Relations and Assistant Secretary*

Ruth E. Mason, *Editor* Sheila Dressner, *Production Editor*

IN THIS ISSUE

Standards Engineers—

Fourth Annual Meeting—Standards Engineers Society 325
Awards to Standards Engineers 331

Building—

Are Concrete Specifications Adequate? By Edmund A. Pratt 333
New Code Adds to Elevator Safety. By G. P. Keogh 336

Highway Traffic—

Foresee Savings in Standard License Plates. By Alfred W. Devine 337

From Other Countries 342

News—

Clarence H. Waring 345
Briefs 346

Standards Outlook. By Leo B. Moore 351

American Standards Activities—

Greetings to the American Standards Association on approval of the 1500th American Standard. By C. H. Fellows 324
American Standards. Status as of October 11 348
What's New on American Standard Projects 349

Single copy 50¢. $7.00 per year (foreign $8.00). Schools and libraries $5.00 (foreign $6.00). This publication is indexed in the Engineering Index and the Industrial Arts Index. Re-entered as second class matter Jan. 25, 1954, at the Post Office, New York, N. Y., under the Act of March 3, 1879.

Opinions expressed by authors in THE MAGAZINE OF STANDARDS *are not necessarily those of the American Standards Association.*

MARGINAL NOTES

The Standards Engineers Convention—

Standards Engineers worked hard at the Fourth Annual Convention of the Standards Engineers Society (see report of meeting beginning on page 325). Keeping in mind the old standard "All work and no play makes Jack a dull boy," however, they found time for relaxation, too. Under arrangements made by the hard-working program committee headed by Arnold White, chairman of the Southern New England Section of the Society, the Fuller Brush Company and Veeder-Root, Inc, sponsored social hours both on Thursday and Friday, September 29 and 30. Founder of the Fuller Brush Company, now chairman of the Board, Alfred C. Fuller attended the social hour sponsored by his company and stayed for the dinner session.

A tour of the Fuller Brush Company was also on the program for the entertainment of wives of SES members who attended the convention.

Group of Standards Engineers' wives on tour at Times Tower, Avon Mountain.

Hartford gave the convention a warm welcome. A number of prominent women helped entertain the ladies who made the trip to Hartford. One of the principal high spots of the ladies' Hartford tour was luncheon at the Times Tower, Avon Mountain. Here they were guests of David Daniel, publisher of The Hartford Times.

Other points of interest were a behind-the-scenes tour of G. Fox & Company, and a tour of the Wadsworth Athenium.

Bob Steele, Sportscaster of Hart-

ford's station WTIC, was moderator of the banquet program "Standards are Vital to Sports." Vernon (Lefty) Gomez, famous former pitcher for the New York Yankees contributed a light touch with his personal reminiscences, billed as "standards" but for the most part outside the scope of any Standards Engineer's experience with engineering standards.

"Lefty" Gomez' reminiscences made Society's banquet a joyful occasion.

The Standards Engineers Society now has six sections, centered about Philadelphia; New York; Binghamton, N. Y.; Washington, D. C.; Pittsburgh; and Hartford, Connecticut. The Society was organized in 1947 to provide means for standards engineers to discuss standardization techniques, and to promote knowledge of and application of standards.

Watch for These Features In the December Issue—

- A report of the Sixth National Conference on Standards, sponsored by the American Standards Association and the National Bureau of Standards, and held at Washington, D. C., October 24-26.
- The annual index to this year's issues of THE MAGAZINE OF STANDARDS.

The Front Cover—

The significance of strength specifications for concrete is the subject of the article by Edmund A. Pratt, page 333. The cover picture shows one of New York City Housing Authority's huge apartment buildings where cement concrete is used. Carefully drawn specifications are important to assure long-lasting safe, and satisfactory dwelling units. Picture courtesy New York City Housing Authority.

JOHN W. MCNAIR

This Month's Standards Personality

John W. McNair, trained as an electrical engineer, has just been awarded the top honor of the Photographic Society of America "for his contributions to the technical phases of photography, particularly in the field of standardization." Mr McNair is Assistant Technical Director of the American Standards Association. The award of the Photographic Society makes him an Honorary Member of that Society.

This photographic award to an electrical engineer might be considered a fitting tribute to a career that has embraced a number of different fields—related and unrelated.

After he was graduated from the University of Virginia in 1924, John McNair saw opportunities in the North and moved from Virginia to New York City. There, he first had a job with the Consolidated Edison Company, followed by a year as Assistant Engineer with the National Electric Light Association, now the Edison Electric Institute. Here he first became interested in standards through work on the National Electrical Safety Code.

By 1927 he had entered the administrative field for which he is especially well qualified, as assistant to H. E. Farrer on the Standards Committee staff of the American Institute of Electrical Engineers. He was first assigned to the development of a standard defining terms used in the electrical industry. Later this work culminated in the American Standard Definitions of Electrical Terms. At the AIEE, Mr McNair worked closely with the American Engineering Standards Committee. After the Committee was reorganized as the American Standards Association and its activities expanded, John McNair became its Electrical Engineer. That was exactly 25 years ago.

At that time his duties were to service the standards committees in the electrical field. His activities expanded to include committees on acoustics, wood poles, radio, optics, electronics, and photography. As Secretary of the United States National Committee of the International Electrotechnical Commission, he has helped to bring about the world-wide acceptance of international recommendations. This work has taken him to meetings in Europe ten times since 1935 as a representative of the USNC.

The work on photography standards, for which he has just been honored, started in 1938. During World War II, when the Armed Forces needed interchangeable equipment that could be depended upon for good service under wartime conditions, Mr McNair helped organize War Committees and gave them service that made it possible to turn out 83 American War Standards in record time. Outstanding accomplishments of this program were specifications for a 16-mm sound motion picture projector for use under field conditions, a photographic exposure computer for military use, standards for films, lenses, and flash bulbs, and components of many kinds in the radio field.

So successful was Mr McNair in administering his department of many different projects that he was selected last year to serve as Assistant Technical Director, second in charge of all ASA technical projects.

Greetings to the

American Standards Association

on approval of

THE 1500th AMERICAN STANDARD

THE approval by the American Standards Association of its 1500th standard, which in this instance just happened to be the ASTM Specifications for Nickel-Chromium-Iron Alloy Seamless Pipe and Tubing, B167, justifies a note of greeting and of best wishes to the ASA.

As one of the five founders of the American Engineering Standards Committee, the forerunner of the ASA, our Society has been vitally interested in the welfare of the Association. There seems no need to record the long list of sectional committees of which ASTM is sole or joint sponsor, or of the participation in other ASA technical and administrative work on the part of leaders and officers of ASTM, or of the large number of ASTM standards which have been approved by the ASA.

One of the principal purposes of the ASA—to assist in avoiding duplication of effort and to coordinate standardization activities of the various member bodies—the technical and professional societies and the trade associations and also of the Federal Government—was never of more significance than today. In ASTM we have been laying great stress on this important philosophy. We must conserve, all we can, the time and efforts of our leading technical people. Avoiding duplication of effort helps to achieve this.

The American Standards Association has grown greatly in the past ten years. It has rendered many notable services to both our industry and our government, including federal, state, and city; and its work in aiding our economy has also bettered mankind's living.

As it moves more actively into the international orbit we can expect further constructive work and good will to result. As the President of ASTM, I bespeak the interest and extend the congratulations of the 13,000 members and committee members of our Society.

C. H. FELLOWS
President
American Society for Testing Materials

Fourth Annual Meeting—

Madhu S. Gokhale, SES president, (standing) opened the Fourth Annual Convention at Hartford. Panel members and SES officers above are (left to right) E. W. Heitz, IBM; K. W. Truhn, Bendix Aviation Corp; A. F. Gagne, Consulting Engineer; Mr Gokhale; Arnold B. White, Veeder-Root, Inc, chairman, Southern New England Section; William E. Aksomitas, Connecticut Purchasing Division; Herald Burns, Ansco.

STANDARDS ENGINEERS SOCIETY

SOME 250 men whose profession is work with standards in government and industry attended the Fourth Annual Convention of the Standards Engineers Society at Hartford, Connecticut, September 29-October 1. They came from all parts of the United States and from Canada.

Meetings such as this are needed to supplement the few textbooks, courses, and literature on standardization and to help in further development of standardization techniques, Madhu S. Gokhale, president of the Society, pointed out. Mr Gokhale is Manager of Mechanical Standards, Radio Corporation of America, Victor Division.

The Organization of a Company Standards Program, first session of the meeting, provided information of this type. A. F. Gagne, Consulting Engineer, A. F. Gagne, Jr, Associates, Binghamton, N. Y., was moderator. Mr Gagne is a director of the Southern Tier Section of the Standards Engineers Society, which was in charge of this session.

The origin of a company standards program, the operating framework, and the way the program operates were considered as they applied to four companies.

A number of points are common to a successful standards program, Mr Gagne pointed out. For example, standards should be made the first responsibility of a top level engineer and have top management's full support. In turn, management is rewarded by reduced costs, higher product quality, and general improvement in operations.

The standards program of the International Business Machines Corporation is largely for the purpose of coordination, since IBM has a number of plants and a good-sized service organization, explained E. W. Heitz, Manager, Standards Engineering Department, IBM Endicott Plant.

K. W. Truhn, Supervisor of Engineering Administration, Scintilla Division, Bendix Aviation Corporation, reported that standardization at Scintilla is carried out by a three-man standards committee representing the Engineering Department, Production, and Inspection. Standards are developed to meet new product requirements; to solve an economic problem; and as an improvement on existing standards. Scintilla's standards are affected by the fact that the company does subcontracting and develops, designs, and builds accessories for a wide variety of customers.

L. G. Harrison, Supervisor of Standards, Link Aviation, Inc, Bing-

hamton, N. Y., described the new standards program initiated early in 1955 at the General Precision Equipment Corporation, with which Link Aviation is affiliated. The GPE Standards Committee which carries out the program is made up of a representative from each of five affiliated companies: General Precision Laboratories, Inc; Librascope, Inc; International Projector Corporation; Kearfott Company, Inc; and Link Aviation, Inc. The committee has top management support.

H. A. Burns, Manager, Production Engineering Department at Ansco, a Division of General Aniline and Film Corporation, described the standards used in operating and maintaining the Ansco plant. This is a chemical plant manufacturing a complete line of photographic film, paper, chemicals, cameras, and accessories. The standards are used in the Maintenance and Construction Engineering Departments. One of the important problems is protection of the photographic film and paper, which are not only sensitive to light but also to many fumes and materials. For this reason, standards are used as the basis for checking raw materials and for quality control, as well as in the drafting room and shop, and in building and maintaining the plant. Mr Burns recommends that a top-flight engineer familiar with the various phases of construction and maintenance be assigned to the job of setting up standards using the conference method.

"The industrial consumer who is alert to the benefits of standardization is unable, in many cases, to purchase sheet metal to the thicknesses listed in the American Standard, [B32.1-1952]" declared F. M. Oberlander, moderator of the session on "The American Standard for Preferred Thicknesses of Thin Flat Metals—How to Make It Work." Mr Oberlander is Manager, Materials Standards, Radio Corporation of America, Camden, N. J. A panel of five members representing a user, two associations of producers, an engineering publication, and an association of warehouses stocking these metals, discussed the problem.

I. V. Williams, Bell Telephone Laboratories, explained that the American Standard was developed following a request by the Society of Automotive Engineers for unification of the many gage systems by which metal sheets and plates have been identified in the past. Purpose of the standard was to designate thicknesses of metal sheets in decimals. It established a series of preferred thicknesses for thin flat metals under 0.250 inch.

A number of difficulties are encountered in putting the standard into use. One is that material to the old gage sizes must be used during a transition period. Another is in trying to purchase material to preferred thicknesses from warehouse stocks. To meet the first difficulty the standard was revised in 1952 and additional sizes were listed as preferred thicknesses. "It is now possible," Mr Williams explained, "to choose a preferred thickness which is within a few thousandths of an inch or less of most of the thicknesses now commonly used."

To meet the second difficulty, Mr Williams advocated the method followed by the Eastern Division of the National Aircraft Standards Committee which reached agreement with a group of warehousemen in New York. The aircraft companies agreed to accept sheet steel to the nearest manufacturers' gage until new material was ordered by the warehouse. The warehousemen, on the other hand, agreed to order new material to standard preferred thicknesses. Procurement in small quantities remains the major problem, particularly in areas where industry is diversified and there is no organization to speak for the groups concerned.

Charles M. Parker, Assistant Vice-President of the American Iron and Steel Institute, also considered the problem to be of greatest concern to those who order less than carload lots. At present about 6 to 8 percent of the sheet steel ordered is rolled to the preferred thickness standard, he said. These orders are mostly from the larger companies which order in heat lots or more and present no problem to the mill. "The steel industry prefers decimal thicknesses to be used rather than gage numbers," Mr Parker said. "We do, of course, use the Manufacturers' Standard Gage for the production of sheet steel, a gage which was established by the Association of American Steel Manufacturers' Technical Committees in 1929."

Any concerted movement to increase the popularity of the preferred thickness standard must of necessity come from the consumer, he declared, commenting that the warehouses stock what their customers want to buy.

The brass mill industry makes it convenient to use the American Standard preferred thicknesses by adding the preferred sizes as Table 1 in its schedule DATA-1. It does not recommend the use of gage numbers. This was the report of T. E. Veltfort, Manager, Copper and Brass Research Association. Economies resulting from the use of the preferred

Panel on Electrical Apparatus and Components—H. G. Arlt, Moderator; Virgil Graham (standing); H. P. Michener.

sizes must await the demand for these sizes, he pointed out.

Purchasers of the product have the power to eliminate the specification of sheet thickness and wire diameters by gage numbers, said G. F. Nordenholt, editor of *Product Engineering*. Design engineers and purchasing agents should specify the sheet thicknesses and wire diameters in inches, within the same tolerance limits as apply to the standard gage numbers, he said. He recommended publicity to bring about greater acceptance of the standard and pledged the support of his publication in furthering its use.

The turnover of all inventory by the 517 member companies of the American Steel Warehouse Association was less than two times per year, R. Shaw reported on behalf of the warehousemen. Steel warehouses as a group distribute almost 20 percent of the total finished steel output in this country, approximately 15 million tons of steel, he said. The problem of inventory control created by a multiplicity of sizes, thicknesses, and grades gives the warehousemen a special interest in the standard.

Customers as well as producers and distributors order the newer metals—aluminum and magnesium —by decimal thickness. In ordering cold rolled carbon steel sheet and stainless steel sheet, Mr Shaw proposed that the standard gage nearest to the preferred thickness be shipped since there is a wide allowable manufacturing tolerance variation in these two products that makes it possible to correlate many of the gage variations with the preferred thickness standards.

H. G. Arlt, Bell Telephone Laboratories, Murray Hill, New Jersey, and chairman of the Metropolitan New York Section of the Standards Engineers Society, was moderator of a session on Standardization of Electrical Apparatus and Components.

A wide range of standards for electronic components is being developed to provide performance requirements, tests, and dimensions for parts used in entertainment receivers, radio and television transmitters, entertainment receiver components,

Panel on Preferred Thicknesses—C. M. Parker; T. E. Veltfort; F. M. Oberlander, Moderator; R. Shaw (speaking); F. V. Kupchak, chairman, Tri-State Chapter, SES, session chairman; G. F. Nordenholt; I. V. Williams.

sound equipment, tube testers, nucleonic instrumentation, and military equipment. This work is done by 130 committees organized by the Radio-Electronics-Television Manufacturers Association, Virgil M. Graham, Associate Director of RETMA's Engineering Department, explained.

Standardization of tubes and semi-conductor devices is carried out by the Joint Electron Tube Engineering Council (JETEC). This Council is a creature of RETMA and the National Electrical Manufacturers Association, and the standards developed are processed for approval by both organizations.

Terminology, symbols, methods of test, and definitions are handled for the most part by the standardization committees of the Institute of Radio Engineers.

Two sectional committees of the American Standards Association are working on national standards for electron tubes and on components for electronic devices. In addition, two technical committees of the International Electrotechnical Commission are working on international recommendations for electronic tubes and valves and electronic components.

In the electrical industry, everything is connected together and must be so standardized that all equipment operates in harmony, from the generators in the power station to the last motor or electric clock on the line. Standards make it possible to avoid conflicts between varying system voltages and frequencies, to assure proper performance of telephone and radio communication, and to maintain reasonable standards of safety throughout, H. P. Michener told the Standards Engineers. Mr Michener is Assistant Manager for Enginering, Engineering and Safety Regulations Department, National Electrical Manufacturers Association.

He described the work of the National Electrical Manufacturers Association and cooperation among standardizing organizations such as the Edison Electric Institute, Underwriters' Laboratories, the American Institute of Electrical Engineers, as well as the coordination of standards by the American Standards Association.

Standards for the installation of electrical equipment necessarily have an important bearing on the equipment itself, he pointed out, in describing the National Electrical Code. The National Electrical Code, a collection of rules governing principally the installation and use of electrical equipment, is intended to reduce the hazard of fires and personal injury from use of electricity. It is one of the oldest standards in the electrical field. The electrical manufacturers participate in development of the Code and in promoting its use as a means of realizing a free and open market for electrical products that comply with nationally recognized standards of reasonable safety.

F. E. Powell, Chairman of the Washington Section of the Society, was moderator of a session at which the question "Should standards be mandatory?" was discussed. Cyril Ainsworth, Technical Director and Assistant Secretary of the American Standards Association, pointed out that standards are fundamentally voluntary in nature. It is the purpose behind the use of a standard that

Alfred C. Fuller, chairman of Board, Fuller Brush Company, was honored guest at the Thursday dinner session. At table are (left to right) Harold I. Gould, vice-chairman, Southern New England Chapter; Richard S. Burke, Sears Roebuck, principal speaker at the dinner; Mr Fuller; Arnold B. White, chairman, Southern New England Chapter; Mrs. White; SES President Madhu Gokhale.

Speakers on automation—C. J. Lawson and Dr C. B. DeCarlo.

creates the mandatory concept and not the standard itself, he said. The combination of voluntary and mandatory aspects in the development and use of standards has made the USA the foremost nation in the world in production, sale, and distribution of goods.

Richard S. Burke, Manager, Merchandise Testing and Development Laboratories, Sears Roebuck and Company, was the principal speaker at the Society's dinner, Thursday evening, September 29. Sidney A. Edwards, Managing Director, Development Commission of the State of Connecticut, welcomed the Standards Conference.

Deploring standard ratings which set a single level as "standard" and that by inference label everything that does not conform as either "substandard" or "over standard," Mr Burke pointed to the difficulty of choosing the qualities to be standardized. In order to arrive at an over-all rating, you must weigh characteristics, he pointed out. Fast freezing of ice cubes and low power consumption are incompatible qualities in a refrigerator, but the weight given each affects the standard rating given the refrigerator. The quality to be considered and the importance assigned to it are frequently a matter of personal choice, and often change with a change in technical developments.

As a mass distributor of consumer goods, "we are heartily in favor of the development of simple, needed standards to help us communicate with our customers about our products, and that give us definitions for the terms we would like to use in our advertising," Mr Burke declared. "We also like rating scales for such single characteristics as the speed of film. We like standards that furnish agreement on a limited number of sizes." For the time being, Sears opposes standards in order to arrive at a quality rating for a finished product, he said; at the same time, however, it recognizes that establishment of clearly understood standards of quality within its own company is essential to success.

"Without Standards, No Automation" was the title of the first session Friday morning, September 30. Harold I. Gould, vice-chairman of the Southern New England Section of the Society, was chairman.

Automation is built upon standards but standardization can cause problems because of the need to keep the way open for new developments, said C. J. Lawson, Director of Standards, International Business Machines Corporation. Standardization of single circuit pluggable units vastly increases the complexity of interconnections and back panel wiring and increases impedance problems. On the other hand, circuit standardization permits greater standardization of other components, such as tubes, diodes and resistors.

A successful automation program requires, first, he said, that standardization and automation be designed into the product; second, that automation be designed parallel to the product design and be programmed for maximum flexibility; and, third, that both point not only at the immediate project but "encompass the farthest horizons of engineering vision." Standard circuits in IBM machines now being designed will be modified as new techniques are developed. Specialists working constantly with manufacturing engineers are packaging circuits on standard printed wiring boards. All have automation and future machines in mind. Machine packaging, too, is being developed along standard modular lines by specialists working with manufacturing engineers who also have automation and future developments in mind. A group in IBM Manufacturing Research is devoting its full effort to factory automation.

IBM itself is using a number of automatic machines in its own production but considers that it has made only a start in automatic factory production. It operates on the principle that IBM must be ready to drop one standard for a better as rapidly as one is developed and will

benefit the company. IBM standardization is aimed at providing parts, components, and modular assemblies which will achieve a comparatively large volume of modules and still enable IBM to build special machines more economically.

For successful automation, both standardization and automation must be broad company programs directed and supported by all factors of company management, Mr Lawson declared. Standardization must begin on the drawing board and be carried forward to the finished product. It must be developed jointly by Engineering and Manufacturing and must provide flexibility for changes for short production runs.

Further development of mathematical and scientific methods in production engineering is foreseen as a corollary of the use of the electronic computer, declared Dr Charles R. DeCarlo, Director of the Applied Science Division, International Business Machines Corporation. Dr DeCarlo urged the teaching of applied mathematics as an engineering tool by university industrial engineering and mechanical engineering departments. Without the precision that is implied in the mathematical treatment of a problem, solutions of complex production and inventory problems would be hopeless, even in the presence of the largest and most powerful computer man will ever build, he said.

The electronic computer has abilities which make it well equipped to help solve many of the complex problems that beset production and inventory management, Dr DeCarlo explained. These abilities are:

1. To handle large volumes of information rapidly both in reading and writing speeds.
2. To handle a large number of variables simultaneously.
3. To perform high-speed arithmetic operations.
4. To perform logical choices.
5. To enumerate a large set of possible actions.
6. To operate in stochastic processes; in other words, to evaluate probability distributions, store density functions, generate random numbers for entry into such tables, and to compute by repeated trial the expected value of variable phenomena.

Roger E. Gay, Director of Cataloging, Standardization, and Inspection, Office of the Assistant Secretary of Defense for Supply and Logistics, was moderator for the session on National Strength Related to Standardization.

The Defense Standardization Program involves some 2¼ million items, explained Captain C. R. Watts, USN, Staff Director for Standardization, Office of Assistant Secretary of Defense (Supply and Logistics). A time schedule has now been set on this program. The first year's program (Fiscal Year 1956) calls for submission by the military departments of a total of 124 preliminary proposals and 73 detailed plans of action. Because of the magnitude of the effort, it would be impossible to devote the necessary manpower to undertake standardization of all of these items at the same time, Captain Watts explained. It is estimated that a minimum of several years will be required to accomplish the first cycle of the new program.

The program under which every item that the Department of Defense buys, stocks, and controls will be identified by means of a single uniform term is already 76 percent complete, Colonel Joseph R. De Luca (USAF) reported. Colonel De Luca is Staff Director for Cataloging, Office of the Assistant Secretary of Defense (Supply and Logistics). By September, 1956, it is expected that every item under the scope of the Federal Cataloging Program in the supply systems of the Department of Defense will be uniformly identified and stock numbered.

This is only the first phase of the Federal Cataloging Program, however, Colonel De Luca pointed out. After a single uniform term is assigned to each item, the identification

Representing the Defense Department on "National Strength Related to Standardization" (above)—Roger E. Gay; Colonel Joseph R. DeLuca, USAF; Nathan Brodsky; Captain Charles R. Watts, USN.

F. E. Powell, chairman, Washington Section, SES, (standing) was Moderator of the session, "Should Standards Be Mandatory?" In picture below—Cyril Ainsworth, ASA; Mr Powell; F. V. Kupchak, session chairman.

of the item in the warehouses, on drawings, and on all records must be converted to use the uniform identification. Total conversion is scheduled for completion in the Department of the Army by October, 1957; in the Department of the Navy by November, 1958; in the Department of the Air Force by December, 1958. The Marine Corps' conversion is coordinated with the other service supply systems from which it receives supply support.

A reduction from 3 million thought-to-be different items to 2.5 million actually different items is foreseen as a result of the Federal Cataloging Program, Colonel De Luca reported. Even more important, the single item identification system provides a foundation for uniform or integrated supply for use in day-to-day worldwide operations within and between all operating levels of the Army, Navy, Air Force, and Marine Corps.

Standardization aids in realistic determination of requirements, an essential to logistics efficiency, declared Nathan Brodsky, Assistant Director, Cataloging, Standardization, and Inspection. Mr Brodsky spoke on the Logistic and Economic Implications of the Defense Standardization Program. Logistics means supplying the right item at the right time at the right place in the right quantity as efficiently and as economically as possible, he explained.

Encouragement of small business in government procurement is one important aspect of the Defense Department's standardization program, Mr Brodsky said. By establishing requirements which call for minimum re-tooling and greater interchangeability and uniformity, there is a tendency to broaden the specifications so that small business may participate more actively.

H. G. Arlt, Bell Telephone Laboratories, vice-president of the Standards Engineers Society, was chairman of the session Saturday morning, October 1. At this session, Vice Admiral G. F. Hussey, Jr, Managing Director of the American Standards Association, was moderator of a symposium on "What's the Future of Standards?" Executives of technical societies and trade associations gave their views. Mrs D. M. Shackleford, Standards Administrator, The American Society of Mechanical Engineers, pointed out that "Even if no new technological advances were to be made for the next ten years, we would be busy developing standards, the need for which is now apparent." She pointed to the Glossary of Terms in Nuclear Science and Technology and work under way on a safety code for handling and use of fissionable material as examples of how work on standards has expanded into the field of nuclear power. Substantial agreement on the language and symbols used in automation appears to be not far off, she said, although "an appalling amount of work" still lies ahead on standardization of component parts of these systems.

Frank O. Hoagland, holder of ASA's Standards Medal, attended SES sessions.

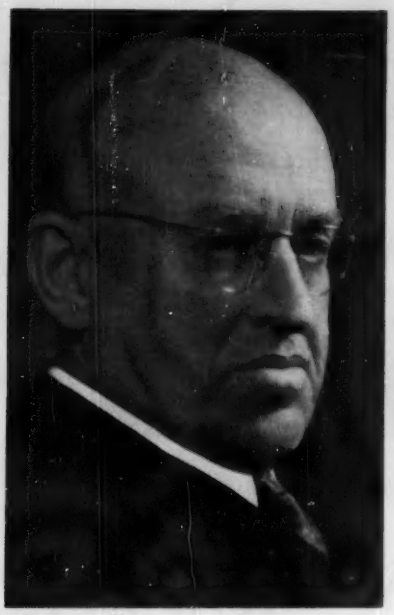
Using slides to emphasize his points, R. J. Painter, Executive Secretary of the American Society for Testing Materials, called attention to the fact that ASTM standards double in number about every 10 or 12 years. Today there are more than 2,200 ASTM standards; in 1928 there were 500. Recently, he said, ASTM activities have entered a number of new fields, such as plastics, materials for electronic devices, hydraulic fluids, carbon black, super alloys, and radioactive isotopes.

He particularly emphasized, however, that ASTM is not solely a standards organization; but is a research and standards organization. Work on standards is not good without the necessary facts to back it up, he pointed out, and conversely, adequate standards of comparison are needed to evaluate the products of research. A great portion of ASTM's work is devoted to getting facts.

Most buyers now use standards even without an organized program in their companies, said C. T. Haffey, Purchasing Agent, Chas Pfizer, Inc, speaking on behalf of the National Association of Purchasing Agents. NAPA is actively working to create interest in standards as a tool of the purchasing agent, he said. Buyers are advised to ask themselves, "Can I use a standard, preferably a national standard?" If they can, they will find they can get material quicker, cheaper, and with less red tape. The work of NAPA is directed mostly to small and medium companies, because these represent the larger proportion of NAPA members and large companies usually have their own standards department, Mr Haffey said.

Also using slides, Don Blanchard, Manager, Technical Committee Division, Society of Automotive Engineers, told of the work the Society has done on standards during 45 of its 50 years in existence. In addition to standards for ground automotive equipment, SAE has been carrying on a rapidly expanding program in the aeronautical field since 1940. The 1914 volume of SAE Standards had 50 pages; the 1955 edition has 1094 pages.

Standards in sports was the theme of the annual meeting banquet. The physical condition of youngsters in the USA today is "alarming," said E. D. Marcus, one of the principal speakers at the banquet. Mr Marcus is Manager of the Industrial Engineering Department of A. G. Spalding Bros, Inc. Statistics show that more than half of U. S. youngsters tested failed one or more of six tests for muscular strength and flexibility whereas only 8.7 percent of European youngsters failed, he said. Mr Marcus believes it is urgent that youngsters be encouraged to participate in sports of all kinds in order to improve their general physical condition.



Ralph E. Flanders

Awards to Standards Engineers

Roger E. Gay accepts certificate from ASA's G. F. Hussey, Jr, 1954 SES award winner.

W. R. G. Baker

Senator Ralph E. Flanders of Vermont was one of five men honored by the Society. Senator Flanders was awarded an honorary fellowship "in recognition of his outstanding contributions in government and industry." These included development of standard screw threads, making possible greater interchangeability, and encouragement of unified screw threads by the United States, the United Kingdom, and Canada.

Others honored "by reason of unusual professional distinction" were Roger E. Gay, Dr Walter R. G. Baker, Harold R. Terhune, and Stanley Zwerling. They were elected Fellows of the Society.

Mr Gay is Director of Cataloging, Standardization and Inspection, Office of the Assistant Secretary of Defense (Supply and Logistics), Washington, D. C., on leave as

Harold R. Terhune, manager, Standards Department, Telecommunications Laboratories, (right) accepts award from SES President, Madhu S. Gokhale. Below—Stanley Zwerling, Assistant Chief, Tests and Approvals Division, Armed Services Electro-Standards Agency, Fort Monmouth, receives certificate. Awards were given for "professional distinction" in standards work.

President of the Bristol Brass Corporation, Bristol, Connecticut. Mr Gay is Past President of the American Standards Association, and a member of the Southern New England Section of the Standards Engineers Society. He has been a director of the National Association of Manufacturers and chairman of its Industrial Problems Committee.

Dr Baker is vice-president and general manager of the Electronics Division, General Electric Company, Syracuse, New York. He has been director of engineering of the Radio-Electronics-Television Manufacturers Association since 1934 and for a number of years was standards coordinator of the Institute of Radio Engineers. He represents RETMA on ASA's Board of Directors. He is a member of the Southern Tier Section of the Standards Engineers Society. Dr Baker has been active in development of American Standards in the electrical and electronics fields as chairman of the Electronics and Communications Division of the American Standards Association's Electrical Standards Committee. Under his direction as chairman of the National Television Committee, standards for monochrome telecasting were developed, recommended, and adopted by the Federal Communications Commission.

Mr Terhune is manager of the Standards Department, Federal Telecommunications Laboratories, Nutley, New Jersey. He is one of the founders and the first Secretary-Treasurer of the Standard Engineers Society, and is treasurer of the Society's Metropolitan New York Section.

Mr Zwerling is Assistant Chief, Tests and Approvals Division, Armed Services Electro-Standards Agency, Fort Monmouth, New Jersey. He was the first president of the Standards Engineers Society and was one of the original founders. He is now a member of the Society's Metropolitan New York Section.

The citation for the award of Honorary Fellow to Senator Flanders reads in full:

"Courageous and far-sighted, he has left the mark of his personality on his many and varied activities in local and national government and in industry. Outstanding as designer and inventor of machine tools, author, industrialist, and U S Senator, he has contributed in many ways to the country's welfare. In standardization, his leadership has helped advance the development and broad acceptance of screw thread standards. Member of the National Screw Thread Commission of the Federal Government and chairman of the American Standards Association's committee on screw threads for many years, he has worked to bring about agreements among varied groups, both nationally and internationally. His chairmanship of the historic meeting that led to American-British-Canadian agreement on Unified Screw Threads will be remembered as an outstanding service in the world of standards."

During his career Senator Flanders has been Associate Editor of *Machinery*; design engineer of the Fellows Gear Shaper Company of Springfield, Vermont; president of the Jones and Lamson Machine Company; and is currently U S Senator from Vermont. He is Past President of the National Machine Tool Builders' Association and Past President of the American Society of Mechanical Engineers.

Are Concrete Specifications Adequate?

by EDMUND A. PRATT
Consulting Engineer

Dreyfus and Co.

THE designer of every structure is playing a game of chance! Whether he knows it or not, there is a chance that the materials he contemplates using may not have the strength he thinks they have. This chance is measurable to a greater degree than is generally recognized.

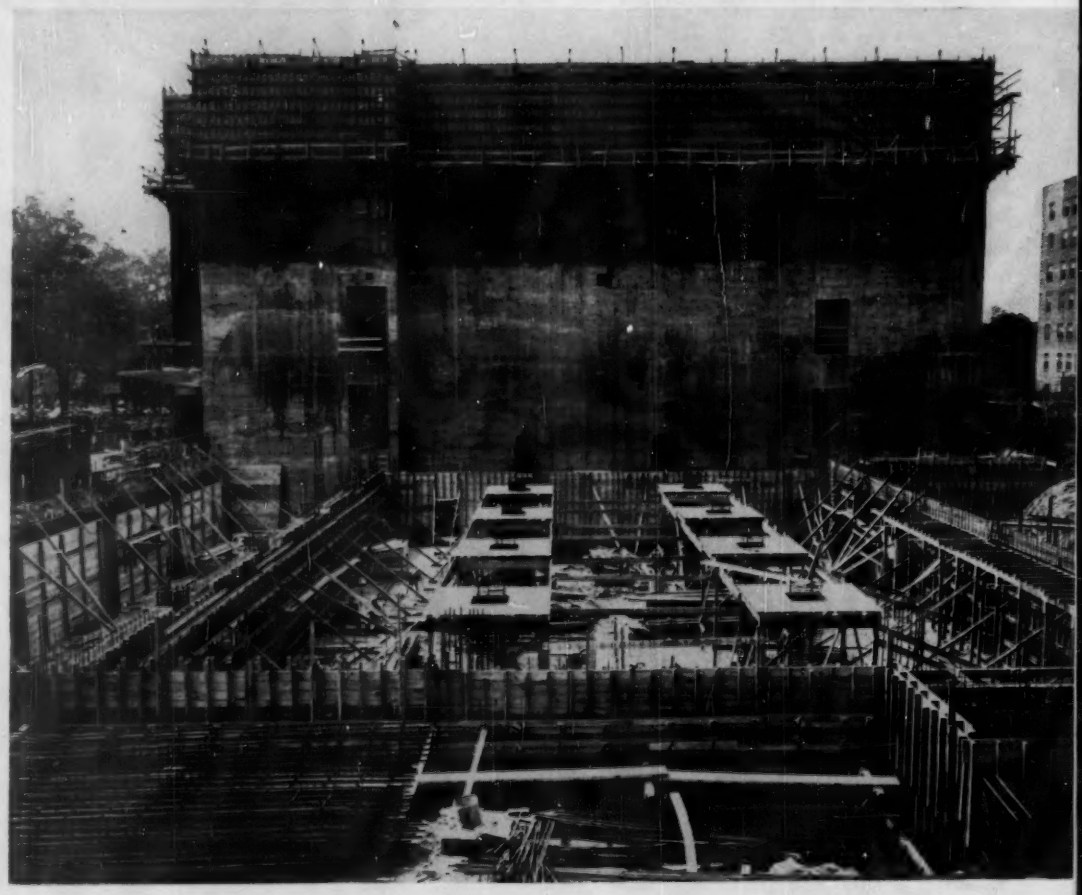
The accompanying illustration appeared recently in a financial advertisement. The idea is equally applicable to the strength of an engineering material such as cement concrete. A statement of average strength alone does not adequately provide the information that a designer needs to have in order to produce a safe and durable structure. He needs also to know how this strength varies above and below the average—particularly below.

Let us suppose the designer is following recognized and approved practice, and is using allowable unit stresses in concrete according to American Standard A89.1-1951. Also that the concrete mix is to be set up according to the New York City Building Code provisions for controlled concrete which, incidentally, are the same as those of Section 302 (Method 2) of A89.1. If the manufacture of the concrete is very poorly controlled, the product may be so variable in strength that, while the mix design meets the requirements of the Code, an individual test result may not only fall below the minimum compressive strength specified—there is actually about one chance in a hundred that *the strength may fall below the allowable working stress.* In this event, assuming that the strength of the test specimen represents the strength of the concrete in the structure, *the factor of safety has vanished.* Of course, in such a case, the surrounding material may come to the aid of the defective part and there may be no general failure. Nevertheless, the possibility of failure is there.

Let us see how this situation comes about. Recorded data from a great number of tests disclose the fact that the deviations of compressive strength of individual test specimens from their mean strength follow the normal law of error, *provided* the same proportions and materials are used throughout and conditions of production remain substantially unchanged. The common measure of dispersion of the individual strength values about the average is the standard deviation. A better measure, for the purpose of this discussion, is the "coefficient of variation," that is, the standard deviation divided by the average strength, usually expressed as a percentage. A poorly controlled concrete may have a coefficient of variation as high as 25 or 26 percent. Bear in mind that this is not the maximum variation; it is the root-mean-square deviation expressed as a percentage of the average; the deviation of an individual sample may be much greater.

The building codes referred to provide for laboratory tests to de-

Cement concrete construction was used in the new Long Lines Switching Center built by A T & T at White Plains, N. Y.



The A T & T Long Lines Switching Center at White Plains during construction. This bomb-resistant building exemplifies the value of good concrete. Both personnel and delicate apparatus are protected by thick walls made of high-quality concrete.

termine the water/cement ratios for various strengths, using the consistency and materials proposed for the work. The ratio adopted is required to be that corresponding to a strength 15 percent greater than the specified minimum strength. In other words, a margin of 15 percent is expected to cover the "variability" of the concrete. The extent to which it does so depends on the quality of the concrete. With the poor quality represented by a coefficient of variation of 26 percent, there is one chance in 3.2 that a test specimen will show a strength less than the specified minimum.

From the standpoint of allowable unit stress (taking extreme fiber stress in flexure as an illustration), this system of mix design is equivalent to a requirement that the average compressive strength of test specimens be 2.56 times the allowable unit stress. That is, the "margin" over unit stress is 156 percent. For a coefficient of variation of 26 percent, there is one chance in 105 that this margin will vanish: that an individual test result will indicate a compressive strength less than the allowable unit stress. With a "fair" quality concrete, having a coefficient of variation of 15 percent, this chance is about one in 41,000, and for a very good quality (coefficient of variation 10 percent) there is but one chance in 2 billion that a test result will show a strength as low as the allowable working stress.

These figures are *probabilities*—they will be true in the long run. As the number of samples increases they become "more probable," and with an infinite number of samples they would become certainties (as nearly as certainty can be meas-

ured). The tendency of engineers to regard extremely low (or high) test results as "freaks" merits some scrutiny. The freakishness of the result may simply be the play of the game of chance. Such results, while exceptional, may be perfectly "normal" and should not be discarded in the absence of compelling reasons (provable facts) for doing so.

Since the designer cannot be certain that the material he works with has the strength he thinks it has, there is but one sound basis for passing judgment on the sufficiency of the specification: What is the *probability* that some portion of the material will not have the requisite strength? With sufficient control and uniformity of materials to ensure that the dispersion of individual strengths approximates the normal law of error, it is a simple matter to determine the degree of uncertainty associated with any given coefficient of variation. Table 1 shows the chances of individual results falling below specified strength for several different coefficients of variation, on the basis of mix design margins of 15 and 20 percent over specified minimum strength.

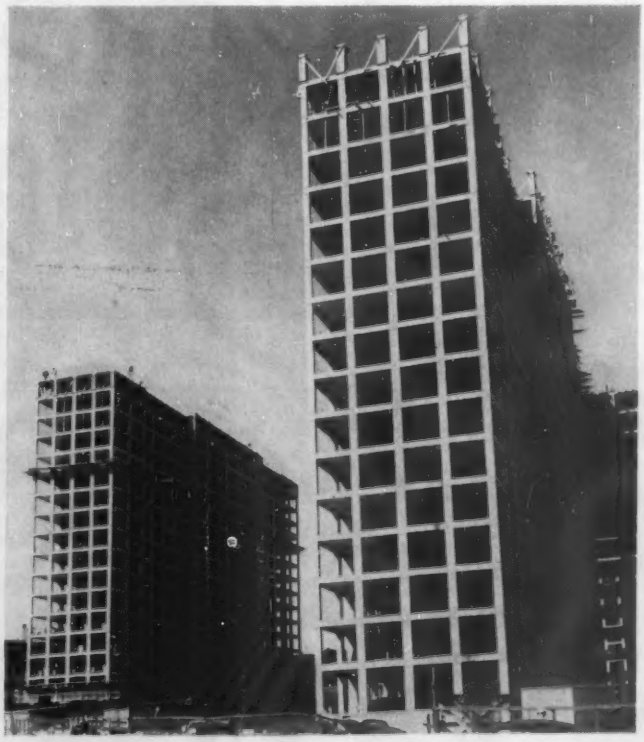
From this table it is apparent that with the 15-percent margin required by the building codes there is still one chance in 10 that a very good quality concrete will at times fail to meet the specified minimum strength, and that the chance of falling below it is one in 19 for an exceptionally high quality product having a coefficient of variation as low as 8 percent. A 20-percent margin would show better results, but even these would not be considered very satisfactory for a concrete having a coefficient of variation over 10 percent. And by many engineers a 10-percent coefficient of variation is considered to indicate "excellent" quality. As the tabulation indicates, the chance of deficient strength occurring decreases very rapidly as the coefficient of variation is reduced below 10 percent. The table also shows that there is not much advantage in designing the mix with a 20-percent margin (instead of 15 percent) if the coefficient of variation is to be permitted to exceed 10 or 12 percent.

TABLE 1—CHANCES OF FALLING BELOW SPECIFIED STRENGTH

Coefficient of Variation	*With 15% Margin*	*With 20% Margin*
25%	1 in 3.3	1 in 4.0
20	1 in 3.9	1 in 4.9
15	1 in 5.2	1 in 7.5
12	1 in 7.2	1 in 12
10	1 in 10	1 in 21
8	1 in 19	1 in 54
6	1 in 67	1 in 366
5	1 in 220	1 in 2326

It would seem that a rational strength specification for cement concrete should specify the permissible coefficient of variation as well as the minimum strength and margin over the latter to be used for mix design. There would then be a reasonably well ascertainable probability of test results showing strengths equal to or above the required minimum. Such sets of data as the author has analyzed indicate that 28-day test results have a lower coefficient of variation than do the 7-day results on test cylinders made from the same samples; they do not support the view that the standard deviation tends to remain constant, nor the opposing view that the coefficient of variation remains unchanged. If, in fact, the coefficient of variation always decreases with age, it is a most important circumstance, because 7-day (or earlier) test results could then be used with confidence to check compliance of the coefficient of variation with the specification, or to forecast it for control purposes if it is not limited by specification.

New York City Housing Authority



These comparatively slender columns and thin floors demand carefully drawn specifications and accurate control during construction.

New Code Adds to Elevator Safety

by G. P. KEOGH

Mr Keogh is Chief, Industrial Code Unit, the New York State Board of Standards and Appeals. He is Chairman of ASA Sectional Committee on Elevators, Escalators, and Dumbwaiters, A17, representing the International Association of Governmental Labor Officials.

THE old party joke about the man who fell down the elevator shaft is becoming obsolete and so may the not-so-funny falls which really do occur when the shaft is open.

The American Standard Safety Code for Elevators, Escalators, and Dumbwaiters now provides for a safety interlocking feature which keeps the shaft door closed unless the elevator car is stopped at that floor.

The fifth edition of this American Standard has been approved by the American Standards Association and has gone to press.

The work on this American Standard began in 1922 at the request of the American Society of Mechanical Engineers, which wanted a nationally-accepted elevator code. The American Standards Association approved the initiation of this project and assigned sponsorship of the work to the ASME, American Institute of Architects, and the National Bureau of Standards.

The committee which actually developed the code represented all parties at interest—elevator manufacturers, insurance carriers, government (federal, state, and local) owners, employees, public interest groups, technical and engineering societies, and others. It worked out these requirements prior to submitting the code for approval to every national organization concerned with elevator, escalator, or dumbwaiter safety.

Always watching for improvements in manufacturing and safety practice, the committee brought the code up-to-date in 1931, 1937, 1945, and in 1955.

The latest revision is the combined work of 22 separate subcommittees consisting of from 4 to 20

The Vanished Alibi

Gone are the good old days when you could tell the little wife you fell down the elevator shaft.

The American Standard Safety Code for Elevators, Escalators and Dumbwaiters provides a special safety interlocking feature which won't allow a hoistway door to be opened until the elevator stops on your floor.

members each, and representing groups especially interested and qualified to draft regulations in the specific field to which they were assigned. The total membership of these subcommittees was 150.

The new code was prepared for use, first, by the designer and installer of equipment; second, by state and municipal enforcing authorities; and, last, by insurance inspectors.

Working platforms on tops of cars are prohibited by the new code. The code says "NO" also to ventilating fans mounted inside the elevator car on brackets; to apparatus and equipment inside the car which is not used in its operation; and to all rope, rod, wheel, crank, or lever-operating devices. It also prohibits the use of rail lubricants which will reduce the holding power of car safety devices.

One of the most important sections in the code, on alterations, repairs, and replacements of existing equipment, is entirely new, and probably has never been covered in any elevator code. The American Standard code lists 22 alterations defined as those of major importance, and specifies which rules must be applied to each alteration as it is made.

For alterations not listed as major, the rules ask that only those alterations directly concerned with public safety conform to the code.

Repairs and replacements of damaged, broken, and worn parts necessary to normal maintenance are permitted to be made with parts of equivalent material, strength, and design; but repair may not be done by welding when the damaged parts being repaired are necessary to support the installation and are under tension or other stress.

The committee felt that improvements and alterations to existing equipment should be encouraged, as in nearly all cases they could be made so as to increase safety. They ask that the new equipment used in improvements and alterations conform to the rules which apply to new elevators.

For instance, one state code requires that, if a worn-out elevator machine is replaced with a new machine, the whole installation, including the hoistway, pit, overhead clearance, hoistway enclosures, and doors must conform to the rules of the installation. The result is that owners continue to make repair on repair and to service old elevators which should be decommissioned. In such a case, the American Standard would say that the worn-out machine could be replaced with a new machine, but that the new machine must be of a type permitted by the revised code unless the machine replaced were an uncounterweighted drum machine of the limited rise and speed permitted for new installations. However, no other parts of the installation would have to be made to conform to the rules for new installations.

Another entirely new section of the code is on hydraulic elevators. Previous editions of the code contained only a few general rules relating to hydraulic machines, tanks, and valves. The 1955 rules cover complete requirements for all parts of hydraulic installations including design data and formulas for cylinders, plungers, valves, piping, fittings, and tanks. All these elevators are required to be of the plunger type and must be equipped with electrically - operated valves. The latter provision, together with requirements for an anti-creep device, permits the safe installation of hoistway door interlocks and car gate or door electric contacts which are mandatory, the same as in electric elevators.

For invalids or others whose physicians forbid stair climbing, the private residence elevator is often used. The new code, for the first time, includes a section on the "know-how" of safety in these elevators with a maximum rated load of 200 pounds, and with a speed of not over 50 feet a minute.

Scattered in various sections of the new code are the following additional important changes:

1. Measures which will practically eliminate injuries to hands and feet caused by the moving parts of escalators, particularly in the case of small children.
2. Elevator and dumbwaiter overhead beams are required to be of steel or reinforced concrete.
3. All wiring, other than that related to the elevator, has been prohibited in elevator hoistways.
4. The protection of spaces which are used as passageways below elevator and dumbwaiter hoistways is now required.
5. All pipes and ducts conveying gases, vapors, or liquids have been excluded from hoistways, except pipes for heating the hoistway itself or for hoistway sprinklers where they conform to the requirements specified.
6. The requirements for car lighting devices have been revised to cover modern lighting fixtures including tube lighting, and the light bulbs and tubes are required to be guarded to prevent injury to passengers from breakage.

The code is so arranged that an elevator inspector may use it as a handbook. He may easily find a particular item which he has in mind without having to read through the whole code.

The former edition of the code contained 138 pages; the new edition has well over 300, and contains 12 parts: Hoistways, Hoistway Enclosures and Related Construction; Machinery and Equipment for Passenger and Freight Elevators; Hydraulic Elevators; Power and Hand Sidewalk Elevators; Private Residence Elevators and Inclined Lifts; Hand Elevators; Hand and Power Dumbwaiters; Escalators; Inspections and Tests of Elevators, Dumbwaiters, and Escalators; Maintenance of Elevators, Dumbwaiters and Escalators; Alteration, Repair, and Replacements; Design Data and Formulas.

The American Standard Safety Code for Elevators, Escalators, and Dumbwaiters, A17.1-1955, will be available from ASA in several weeks. The committee, believing that it has produced a revised document for public safety—one that the American Standards Association may well be proud of having approved—commend it to the nation.

Foresee Savings in

Standard License Plates

by ALFRED W. DEVINE

1953 license plates appeared in a variety of sizes and styles.

U. S. Bureau of Public Roads

These recommended combinations of letters and numerals can be used for readable license plates in the standard size. Choosing combinations at left, a state would have the following different numbers for licensing cars—(top to bottom) with six digits, 999,999; *five digits,* 99,999; *one-letter prefix in a total of six,* 2,299,977; *two-letter prefix arranged one above the other in a total of six,* 5,289,471. *At right (top to bottom), with two letters, first and third in a total of six,* 5,290,000; *two letters, first and third of a total of five,* 529,000; *two-letter prefix or suffix in a total of six,* 5,289,471; *one-letter prefix, in diamond outline,* 229,997.

NOW, after a great many years of work, a standard size for automobile license plates seems to be near general use. This will make it possible for automobile manufacturers to provide standard mountings for the standard license plates as part of the car body and will lessen the danger of theft as well as providing greater economy for the states. It is expected that some cars will use the new standard size by the fall of 1956. This is due to the fact that the states, provinces, and other jurisdictions all of which are members of the American Association of Motor Vehicle Administrators have now generally accepted the standard prepared by a Joint Committee of the motor vehicle administrators and the automobile industry.

Work on standards concerning number plates goes back many years. The first statute requiring approval of rear lamps was enacted in Massachusetts in 1921 and necessitated the adoption of specifications that included the dimensions of bolt-slots in the number plate brackets. A few years later, the Society of Automotive Engineers adopted a standard set of dimensions for "license-plate bracket-slots."

In March of 1935, a License Plate Subcommittee of the Society of Automotive Engineers, of which the author was chairman, took over an operation on which some work had been done but on which no report had been filed. After about a year's work, a standard size for number plates, 6¼ in. by 10 in., was reported out of committee and adopted by the Society of Automotive Engineers in June, 1936. In the absence of any organized effort during the next few years to make use of this standard, it was deemed to be ineffectual and therefore finally was dropped by the Society.

On other occasions in recent years, efforts have been made to secure some sort of standardization with respect to number plates. The American Association of Motor Vehicle Administrators (AAMVA) at its 1940 meeting in Albuquerque empowered its Engineering Committee to take up the subject of the standardization of license plate sizes. As a result, the Engineering Committee recommended a standard for license plates which was adopted by that Association at its

Mr Devine is Assistant to the Registrar, Registry of Motor Vehicles, The Commonwealth of Massachusetts, Boston, and member of the Lighting Division of the Society of Automotive Engineers for thirty years, member of the Engineering Committee of the AAMVA since its inception, and member of the Joint Committee of the latter and the Engineering Advisory Committee of the Automobile Manufacturers Association. He was chairman of the ASA Sectional Committee on Safety Glass, Z26, at the time the first edition of the American Standard for automobile safety glass was developed and approved.

1946 meeting in San Francisco. This standard provided in part for a plate 6 in. high and from 7¼ in. to 14 in. long. It, too, never became effective in practice because of the variation permitted in length and again because of the lack of any organized effort to make it effective.

In 1951, our AAMVA Engineering Committee reopened the subject and appointed a subcommittee for the purpose of pursuing the matter vigorously, working jointly with a committee representing the automobile industry. This Joint Committee met in Hartford on December 15, 1952, and reviewed the subject very thoroughly. During the following months, a proposed standard was whipped into final shape.

Our Joint Committee reported to the AAMVA Engineering Committee at its June, 1953, meeting in Detroit and recommended the adoption of a 6 in. by 12 in. standard size. The recommendation was accepted and presented to the AAMVA as part of the committee report at the October, 1953, meeting in Richmond. The report was accepted by the Association and the member states and provinces were urged to adopt the standard.

Now, at last, we have a general acceptance of the standard by the various states, provinces, and other jurisdictions, and the automobile manufacturers are planning to furnish suitable receptacles for the one size in at least some 1957 models. Such receptacles should be furnished for a front plate as well as for a rear plate. The states and provinces should anticipate the use of the new standard size on some cars in the fall of 1956.

Why the Standard Size?

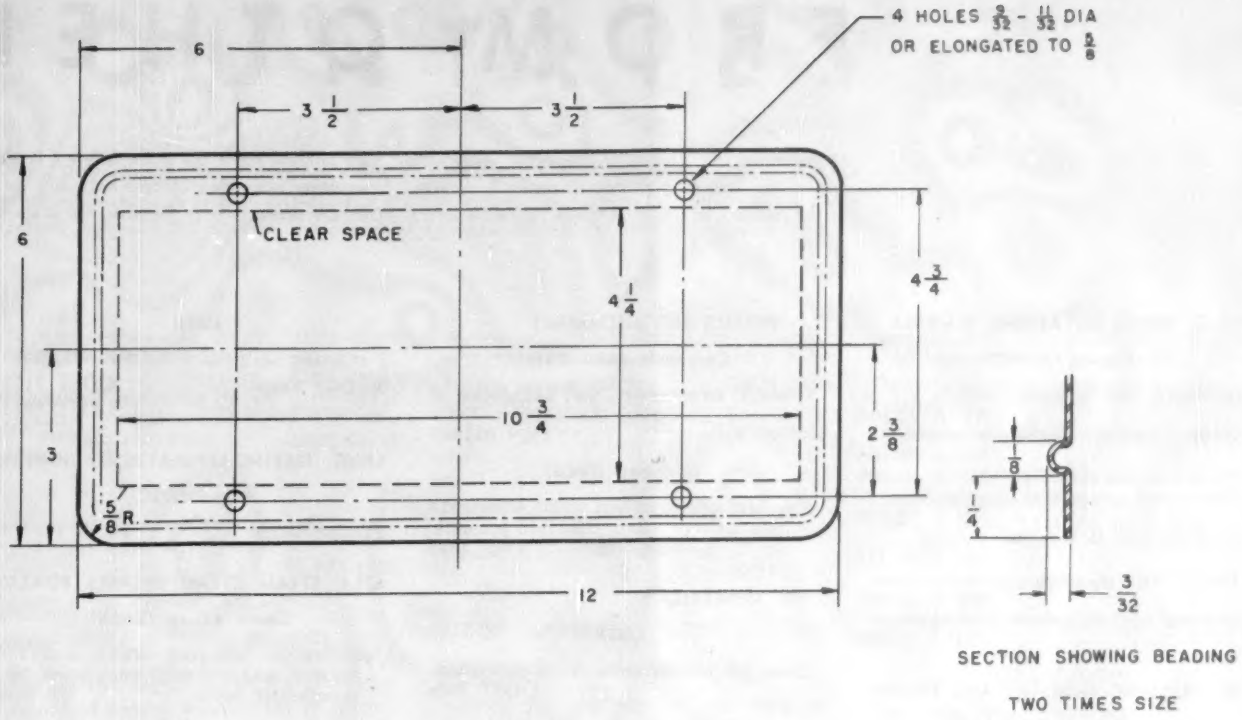
Any state or province could gain certain advantages by having a single standard sized plate of its own, even though such standard did not extend beyond its own jurisdiction. Some such advantages would be savings in steel and paint, simpler storageability, greater ease of handling, one size of envelopes and cartons, and more uniform postage rates. The gross weight of stored plates may also be a factor, as it was in one of our branch offices in Massachusetts. In this case it became necessary to hire outside warehouse space because the construction of our office building would not permit the storage of as great a weight of plates as was required to be kept on hand for issue in the following year.

The national standard adds immeasurably to these advantages because, for the first time, it permits the automobile manufacturer to provide a suitable receptacle within the outer contour of the vehicle. Additional advantages gained by having a universal standard include simplified mounting, protection from theft, lessening of personal injury hazards, improved appearance, and the possibility of improved day and night legibility.

Plate Legibility

Maximum legibility is dependent to a very considerable degree upon the colors which are used. Strong contrast is important and is best exemplified by the difference between black and white. It is my understanding that all plates issued within the various jurisdictions are embossed,—that is, the symbols are raised above the background. Such being the case, the light from any source of illumination which strikes the plate at an angle, such as that from a license plate lamp, casts a shadow of the embossed symbol into the background. Then it must be apparent that the background should be coated with the darker color so that the shadow may merge with it, and not distort the appearance of the shape of the symbol as would be the case if the background were of the lighter color. For optimum conditions, the background should have a mat or dull finish insofar as that objective can be attained. In any event, any

Shapes recommended for letters and numerals for license plates.



Standard dimensions showing clear space available for state use.

process, such as reflectorization, which increases the luster of the background, should be avoided. However, this objection to the reflectorization or high gloss of the background does not necessarily apply to the symbols because these are the parts which must be seen, while the background should be just that, — inconspicuous background.

The width, height, stroke, spacing, and clearance of the symbols are of an importance equal to that of the colors used. The limitations of the human eye do not permit it to distinguish between the sizes of objects which subtend less than a certain angle from the eye (approximately one minute of arc or one-quarter inch at 72 feet). Hence, it will be seen that the spacing between the symbols is of the utmost importance; otherwise, as the observer's range is increased, the bulging parts of two adjacent symbols will appear to merge at a shorter distance than they should, and the legibility distance will be reduced thereby. This means that the stroke of the symbols must be as narrow as practical, determined by observation, in order to increase the background area. It is also necessary to strike a reasonable balance by trial between the width of the symbol and the space between any two of them. Ordinarily, the width of the symbol must be given greater attention than the height for, with reasonable proportions, the latter may be varied within greater limits than the former without seriously interfering with legibility. Similar reasoning applies to the clearance between the symbols and other matter appearing on the plate or between the symbols and any light-colored or reflecting frame. The shapes, sizes, and instructions shown on the sheet entitled "Standard Shapes For Automobile License Plate Symbols" form a good basic guide. This sheet was prepared by members of the joint committee referred to above.

Clear Space

The figure above gives the standard plate dimensions and in addition shows an outline of the clear space available for use by the various states and provinces. They may use any of this clear space for the printed design. The area outside of this outline may be covered by the means of attachment furnished by the automobile manufacturer. It is vitally important that each of the two interests should respect the area reserved for the other, otherwise part of the printed design may be covered by the attaching apparatus.

It is difficult to realize that now, after over one-third of a century, automobile number plate size standardization is becoming an accomplished fact. Many times during that period, it seemed that the objective could never be reached because of the difficulty of getting the political jurisdictions to act in concert. The plates in a few states will be unchanged in size but those in the majority of states must be made smaller, or in some cases must be made larger, and the provisions for attachment must be changed to agree with the standard.

FROM OTHER

Members of the American Standards Association may borrow from the ASA Library copies of any of the following standards recently received from other countries. Orders may also be sent to the country of origin through the ASA office. Titles are given here in English, but documents

003.62 SIGNS, NOTATIONS, SYMBOLS

France (AFNOR)

Geometric and vectorial symbols NF X 02-102
Symbols used in resistance of materials NF X 02-106
Physico-chemical symbols NF X 02-108
Operational symbols of calculus NF X 02-109
Symbols used in tensorial algebra NF X 02-111
Terminology of measuring instruments NF X 07-001
Symbols used in geometry of optics NF S 10-004

69 BUILDING INDUSTRY AND TRADES

Argentina (IRAM)

Test for bleeding of cement IRAM 1604

Germany (DNA)

2 stds for metal windows in dwellings DIN 18061/2
16 stds for different contract specifications for building constructions: general specifications regarding electric wiring in buildings and low-voltage appliances DIN 18300/1, 1803/6, 18320, 18332/3, 18339, 18363, 18380/4
2 stds for details of wooden doors DIN 18101/2
2 stds for revolving shutters DIN 18076/7

New Zealand (NZSI)

Code of sanitary plumbing and drainage by-laws 671, March, 1954
Specification for building boards 1103-05, Oct. 1953
Specification for fire-doors and fire-windows 1188, Apr. 1954
Code of practice for painting CP 5, Jan. 1954

Poland

Calculation of brick constructions PN B-03002

Portugal (IGPAI)

Slates NP-51

South Africa (SABS)

Comprehensive model building regulations, Chapter 2, Administration, Part 1, for the Cape Province 023-1954
Std specification for mastic asphalt for roofing 297-1954
Std specification for mastic asphalt for damp-proof courses and tanking 298-1954

414 PHONETICS

Czechoslovakia (CSN)

Tables of phonetic code words in different languages for designating letters and figures CSN 011690

53 PHYSICS AND MECHANICS

Czechoslovakia (CSN)

Symbols, terminology, and definitions of thermal insulating technique CSN 011805

Germany (DNA)

Pressure definitions and units DIN 1314
Standard temperature. Standard pressure. Standard conditioning DIN 1343

549 MINERALOGY

USSR

Silica gel, classification and specification GOST 3956

54 CHEMISTRY

USSR

Analysis of gases, natural and industrial GOST 7018
Lead concentrate, chemical analysis of GOST 2247
Methylalcohol, synthetic GOST 6995
Volumetric flasks for sulfuric acid and isoamyl alcohol GOST 6859

614.8 SAFETY MEASURES

Argentina (IRAM)

Fire-extinguishers, soda-acid type IRAM 3511

Germany (DNA)

Motorized ambulance for 1 to 4 persons DIN 75080

New Zealand (NZSI)

Recommendations for the installation, maintenance, and operation of first-aid fire extinguishers 932, Oct. 1953
Std specification for hydraulic hose-reels 1168, Apr. 1954

USSR

Welders' masks and shields GOST 1361
Snap-hook for firemen's belts GOST 7041
3 stds for spraying nozzles, different types GOST 7042/4
Firemen safety belts GOST 7040
Foam-forming extinguisher GOST 6948

615 PHARMACY, THERAPEUTICS

Czechoslovakia (CSN)

Anti-diphtheric vaccine CSN 863111
Anti-whooping cough vaccine CSN 863113

Japan (JISC)

Injection needles JIS T 3101 *
Glass syringes JIS T 3201 *

USSR

2 stds for scalpels GOST 605, 5069
Surgical tongs GOST 3115
Sphygmomanometer GOST 6915

620.05 TESTING APPARATUS, MACHINERY

Japan (JISC)

Tension tester JIS B 7721 *

621.1 STEAM. STEAM ENGINES. BOILERS

South Africa (SABS)

Specification for cold drawn and hot finished seamless mild steel boiler and superheater tubes 520-1954

Germany (DNA)

4 stds for different screws and bolts used in locomotives DIN 30327, Bl. 1, 2
DIN 30328, Bl. 1, 2

621.3 ELECTRICAL ENGINEERING

Austria (ONA)

Prongs for electric tester ÖNORM E 1351
Dustproofing test ÖNORM E 1352
Water-spray proofing test ÖNORM E 1355
Pendulum shock test ÖNORM E 1358
Hook-shaped insulator bracket ÖNORM E 4153

Denmark (DS)

3 stds for supports and accessories for overhead lines from 10 kv to 15 kv DS 392.0, -.2, -.4
Tower for transformer substation. Dimensions DS 770.1
Stay rod and stay anchor for distribution lines DS 778
Rigid support of overhead lines DS 779
Flat latticed steel poles for overhead lines DS 786
Square latticed steel poles for overhead lines DS 787

Germany (DNA)

Cotton- and artificial silk insulating tapes DIN 40630
Incandescent lamps. General definition of tests DIN 49895
Starter for discharge lamp DIN 49863
Sockets of discharge lamps DIN 49653/4
Drum for trolley contact wire DIN 43139
Magnetic core for telecommunication DIN 41285
Nameplate for electric machines DIN 42961
Parallel wire-stretcher tongs DIN 48330

COUNTRIES

*are in the language of the country from which they were received. An asterisk * indicates that the standard is available in English as well. For the convenience of readers, the standards are listed under their general UDC classifications. In ordering please refer to the number following the title.*

Connection clamps, details DIN 46205
High-tension fuses for 3 to 30 kv DIN 43625
Lightning grounding clamps DIN 48818
Electric hot plates and ovens with temperature regulators DIN 44918

India (ISI)

Wooden separators for lead-acid storage batteries for motor-vehicles IS 652-1955

Japan (JISC)

Conductivity of copper material JIS C 3001 *
Hard-drawn copper wire JIS C 3101 *
Annealed copper wire JIS C 3102 *
Electric bulbs for radio panel JIS C 7509 *
Electric bulbs for dynamo-lighted bicycle lamp JIS C 7510 *
Portable electric lamps JIS C 8104 *
Dry batteries JIS C 8506 *

Poland

Connecting clamps of electric meters, panel type PN E-88200

South Africa (SABS)

Std specification for paper-insulated electric cables for heavy duty 98-1954

Switzerland (SNV)

Insulating plastic conduits VSM 11930

621.64 DEVICES FOR CONVEYANCE AND STORAGE OF GASES AND LIQUIDS

Chile (INDITECNOR)

Copper pipes for liquids INDITECNOR 61-1
Soldering fittings for copper pipes INDITECNOR 61-2

Czechoslovakia (CSN)

6 stds for gas cylinders and their parts CSN 021435, -1439, -1918, -1935, -5235, -9128
6 stds for flanged pipe fittings CSN 133040/5

Denmark (DS)

4 stds for detail of union for pipeline in dairy plants DS 722.0/3
4 stds for tees and elbows for pipeline in dairy plants DS 723/6

France (AFNOR)

2 stds for weldable flanges for mineral oil pipe lines in plants NF M 87-176/7

Germany (DNA)

3 stds for different types of metal drums DIN 6635/7
Metric and Whitworth form of screw thread for drum plugs DIN 6630
Piping, general survey DIN 2410
Steel pipes, screwing, light, medium and heavy series DIN 2439/41

Mexico (DGN)

Seamless tubes for condensors DGN B 70-1954
Copper tubing for refrigeration DGN B 71-1954

621.791 SOLDERING, WELDING, CUTTING

Japan (JISC)

Method for qualification procedure of manual arc and gas welding JIS Z 3801 *

Switzerland (SNV)

2 stds for spot welding of steel. General rules VSM 14100, -102

621.798 PACKING AND DESPATCH EQUIPMENT

Canada (CSA)

Specification for cleated plywood boxes Z102.5-1955

Germany (DNA)

Different types of plastic seals DIN 16900

621.8 MACHINE PARTS. HOISTING AND CONVEYING MACHINERY. POWER TRANSMISSION. MEANS OF ATTACHMENT. LUBRICATION

Austria (ONA)

Hexagon nuts, unfinished, from M5 to M68 thread ÖNORM M 5216
Lock washers, thin sheet metal ÖNORM M 5292
Spring lock washers ÖNORM M 5292
Round-head rivets for boiler work ÖNORM M 5335/6

Czechoslovakia (CSN)

5 stds for load-handling pallets CSN 269150/4
17 stds for different types of oil cups, grease cups, etc. CSN series 0274....
21 stds for different types of oil and grease pressure guns and parts CSN series 2314....

France (AFNOR)

Two-piece tubular rivets NF E 27-531

Germany (DNA)

Determination of neutralization index of lubricants DIN 51558
Determination of saponification number of lubricants DIN 51559
Determination of moisture content in lubricants DIN 51582
Determination of emulsification properties DIN 51591
Hexagon-head thru-bolts DIN 7968
Countersunk head bolts, with and without hexagon nuts, for steel structures DIN 7969

Japan (JISC)

Screw-drivers for Phillips-type screws JIS B 4633 *

Mexico (DGN)

Steel nuts, finished and semi-finished DGN B 73-1954

Poland

5 stds for tolerances of metric thread, series A to F PN M-02106/7, -109/11
4 stds for butress screw thread PN M-02019/20, -022, -024
2 stds for acme type screw thread PN M-02017, -023
Transmission pulleys PN M-85003

Switzerland (SNV)

Hexagon-head machine screws, Whitworth thread ¼" to 2" and metric thread M6 to M52 VSM 12368
Hexagon-head machine screws with dog tip for cotter pin, Whitworth ⅛" to 1¼", metric M12 to M33 VSM 12398
Finn-head bolts VSM 12518
Butt-end bolts VSM 12519

USSR

Cotter pins GOST 397
Washers, semi-finished GOST 6957
Washers, general requirements GOST 6960
Washers, heavy type GOST 6958
Various fastenings. Packing, marking and acceptance rules GOST 1471
10 stds for different wrenches (bound together) GOST 2838/41, -2906, 3106/9, -3329
Grease gun GOST 3643
Oil filter for shipboard auxiliary mechanisms GOST 6898
Filters for heavy grease lubricators GOST 6918
Oil for refrigerating machines GOST 5546

621.9 MACHINE TOOLS

Argentina (IRAM)

Metal working machine tools. Nomenclature IRAM 5041

Germany (DNA)

Tapered drills for drilling stud-holes DIN 1898

Shell milling cutter from 40 to 160 mm DIN 1880
Reamers, nominal diameter 8.8 to 50 mm with morse taper shank DIN 343
Reamers, nominal diameter 4.8 to 30 mm with straight shank DIN 344

India (ISI)

Drilling jig bushes IS 666-1955

Poland

Spindle of grinding machines PN M-55070
Machine tool shank sleeves PN M-55024

USSR

Grinding and polishing machines GOST 2983
Metal slitting saws GOST 2679
Tee-slot milling cutters GOST 7063
Milling lathes, basic dimensions GOST 6955
3 stds for hobbing machines GOST 6818, 6852/3
Reamers GOST 1523
High speed steel tipped cutting tools GOST 7083
Nut taps, types and sizes GOST 1604
Machine type taps GOST 3266
Multi-spindle lathes GOST 6945
Hand rasps GOST 6876
Hook taps GOST 6951
Metal cutting machinery GOST 7035
Stamping hammers, steam and pneumatic GOST 7024
Wood-working machines: mortizers GOST 6855
Band-saw for wood GOST 6854
Centrifugal machine, suspension type GOST 374
Gas pipe taps GOST 6956
Forging machines, horizontal GOST 7023
Ore-crushing machine GOST 6937

622 MINING

Czechoslovakia (CSN)

14 stds for different types of drills and drilling rods CSN 4510.... 4511.... 4513....4514....
Rotary hollow drills CSN 420257

France (AFNOR)

Mining conveyor belts NF M 81-650

Germany (DNA)

Miners' plastic protective helmet DIN 23313
Articulated metal stemple DIN 21534, Bl.1

USSR

Auxiliary mining winches GOST 5259
Mixing tanks for crushed ores GOST 6932

624 CIVIL ENGINEERING

Austria (ONA)

3 stds for different calculation of structures ÖNORM B 4000, pts. 3 and 6 ÖNORM B 4001
General rules for calculation of road bridges ÖNORM B 4302
Basic rules relative to different concrete structures ÖNORM B 3302

Belgium (IBN)

General rules for reinforced concrete structures NBN 15

Germany (DNA)

Recessed wall space for electric and gas meters DIN 18013

625 RAILWAYS AND TRAMWAYS. ROADS AND STREETS

France (AFNOR)

3 stds for details of automatic air brake NF F 11-013/5

Germany (DNA)

6 stds for different details of railway car truck construction DIN 22603/6, 22612/3
Railway truck center plate DIN 22615, Bl. 1 and 2

USSR

Rails for wide gage track type R 38 and RE 43 from Martens steel GOST 4224
Fishplates for rails of wide gagetrack GOST 4133
Tieplates GOST 7056
Electric transport systems GOST 6962
Electric bulbs for railroads GOST 1181
Road rollers, trailers type GOST 6938
Graders, trailer type GOST 6930
Road roller, motorized GOST 5576

626 HYDRAULIC ENGINEERING

USSR

Rubber packing collars for hydraulic machinery GOST 6969

629.12 SHIPS AND SHIPBUILDING

Japan (JISC)

Bollards JIS F 2001 *
Cowl-head ventilators JIS F 2409 *

Poland

3 stds for oars and oar-locks in ships' lifesaving boats PN W-46002

USSR

Hand fuel pump for ships GOST 6916
5 stds for ship lights GOST 4290/94

629.13 AERONAUTICS, AIRCRAFT ENGINEERING

France (AFNOR)

3 stds for different ball and socket joints NF L 26-110, 31-510, 35-450
Rim of main landing wheels with low pressure tires NF L 82-651
Rim of auxiliary landing wheels with low pressure tires NF L 82-652
Low-pressure tires for main and auxiliary landing wheels NF L 82-671/2
Valve of tubes for low-pressure tires NF L 82-691

Poland

3 stds for different types of flexible conduit hangers PN L-74011/3

628.2 SEWERS

Germany (DNA)

9 stds for different types of sewer manhole covers DIN 1214/5, 1218, 1220/1, DIN 1231/2

629.11 LAND VEHICLES, TRANSPORT ENGINEERING

France (AFNOR)

Taper shaft ends NF R 124-04
Spherical lubricating nipples NF R 165-21
Bicycle wheels spokes NF R 327-08
Bicycle electric head lamp NF R 336-01/2
Coupling of truck trailers NF R 411-65

Germany (DNA)

Valve for tubeless automobile tires DIN 7779
Speedometer DIN 75521, Bl.3
Drain cocks DIN 71401, Bl, 2, 2
Steering wheels DIN 74101, Bl. 1, 2
Tie-cable nipples DIN 71988
Dashboard thermometer DIN 75575
Carplate designating nationality DIN 74068

Poland

Wheel rims for motorcycles and sidecars PN S-91244
2 stds for grease guns PN S-61060/1

USSR

Form of sprocket tooth for driving chains of trucks GOST 590
Tail lights for trucks and trailers GOST 6964
Method of testing passenger automobiles GOST 6905
Spark plugs for motor cars and motorcycles GOST 2043
Brake lining for passenger cars GOST 6914
Method of testing motor trucks GOST 6875
Hard rubber automobile battery cases GOST 6980

63 AGRICULTURE

Germany (DNA)

3 stds for agricultural hand tools DIN 11554, -569, -595

USSR

Cultivators, method of field testing of GOST 3019
Grain cleansing machines; test methods of GOST 3949
Scythes GOST 2935
Tractor plows GOST 6939
Agricultural tractors, method of field testing GOST 7057
Digitalis leaves for medicinal use GOST 2627
Tobacco "Makhorka" GOST 6888
Dry eucaliptus leaves, medicinal GOST 7071
Peanut beans (arachis) GOST 7078
Garlic seeds GOST 7008
Potatoes seeds GOST 7001
Onion seeds GOST 7002
Strawberries, fresh GOST 6828
Black currant, fresh GOST 6829
Red currant, fresh GOST 6832
Raspberry, fresh GOST 6831
Gooseberry, fresh GOST 6830

655 PRINTING. PUBLISHING

Belgium (IBN)

Layout of printed pages for A4 and A5 paper sizes NBN 347

USSR

Zinc sheets used for cuts GOST 1202
Method of obtaining uniform copies from a platen press GOST 6941

Clarence H. Waring

Clarence H. Waring, Gas Service Company, died July 19, 1955. Mr Waring had been chairman of ASA Sectional Committee Z21, known as the AGA Approval Requirements Committee for 14 years. During that time the committee has continued to develop American Standards for use in checking the performance of gas-burning appliances and to keep those already developed up to date. Appliances meeting the requirements of American Standards carry the blue seal of approval of the American Gas Association.

Expressing its appreciation for the work Mr Waring did, and sorrow at his passing, Committee Z21 passed the following resolution at its meeting September 20:

RESOLUTION

WHEREAS, CLARENCE H. WARING, At the height of his distinguished career in the gas industry, departed this life on July 19, 1955, and,

WHEREAS, For fourteen years he had been Chairman of ASA Sectional Committee, Project Z21, AGA Approval Requirements Committee, guiding the Committee with courage and conscientious attention to its task of formulating and revising national safety standards for the benefit of the gas industry and the public it serves, and,

WHEREAS, Through this endeavor he has brought about the development or revision of some thirty-nine sets of American Standards for gas appliances and their accessories covering nearly every type of gas appliance, and,

WHEREAS, He gave freely of his time and talents to the direct task of preparing requirements and assisting our industry in maintaining its high position and esteem by service on the following groups:

Laboratories Managing Committee, 1941-1955; Vice Chairman, 1952-1955

Approval Requirements Committee, 1940-1955; Chairman, 1941-1955

Chairman, Executive Committee, Approval Requirements Committee, 1946-1955

Chairman, Subcommittee on Pipe Joint Research, 1934-1936

Subcommittee on Listing and Installation Requirements for Conversion Burners, 1936-1940

Subcommittee on Approval Requirements for Gas Water Heaters, 1937 - 1940; Chairman, 1940

Subcommittee on Standardization of Requirements, 1940

Subcommittee on Approval and Listing Requirements Correlation, 1940

Subcommittee on Appliance and Accessory Changes Affecting Requirements, 1940 - 1949; Chairman, 1941-1949

Chairman, Subcommittee on Requirements Committee Procedure and Personnel, 1941-1949, and,

WHEREAS, This Committee, with the deepest regret, realizes the irreparable loss it has suffered through the untimely death of its honored Chairman; therefore be it *Resolved,* That the Committee in meeting assembled on September 20, 1955, expresses its profound grief in the untimely death of Clarence H. Waring and its deepest sympathy to his family in its bereavement; and, be it further *Resolved,* That this Resolution be spread on the minutes of the meeting and a copy be sent to the daughters of its beloved leader and friend.

The first comprehensive survey of a new motion time system

DMT— DIMENSIONAL MOTION TIMES

Development and Application

By H. C. GEPPINGER, Supervisor, Motion and Time Study Training, The General Electric Company; Lecturer, University of Bridgeport

DMT has come into prominence because it offers greater precision in the measurement and recording of work details. It avoids intangible descriptions and generalities, substituting facts and figures for judgment.

Work content is measured by time values based on part size, part shape, distance, target size, clearance, and other *specific* dimensional terms. It substitutes precise descriptions for such general, inexact terms as *small, large, easy,* and *difficult.*

As described in this book, DMT is positive and self-contained. Familiarity with decimal equivalents and the ability to read blue-prints are the only requirements for a full appreciation of the technique. Dr. Geppinger presents concrete examples of the application of the system and shows how motion times are affected by changes in engineering, methods, and materials.

1955 100 pages $4.00

TECHNICAL PUBLICATIONS

Their Purpose
Preparation and Production

By C. BAKER

A dependable guide to the preparation and production of technical literature.

1955 302 pages $6.00

MAIL THIS COUPON TODAY FOR YOUR ON-APPROVAL COPIES

JOHN WILEY & SONS, Inc. MS-115
440 Fourth Ave., New York 16, N. Y.

Please send me the book(s) checked to read and examine ON APPROVAL. In 10 days I will return the money and owe nothing, or will remit the full purchase price, plus postage.

☐ DMT—DIMENSIONAL MOTION TIMES, $4.00
☐ TECHNICAL PUBLICATIONS, $6.00

Name .....
Address .....
City..... Zone..... State.....

☐ SAVE POSTAGE! Check here if you ENCLOSE purchase price, in which case we pay postage. Same return privilege.

NEWS BRIEFS.....

• H. R. Terhune, Federal Telecommunications Laboratories, takes exception to a statement in a recent column by Leo B. Moore (Standards Outlook, THE MAG OF STDS, December, 1954, page 403). Mr Moore had said that committees are slow and that an expert, working alone, can produce standards much faster. However, the expert has difficulty gaining and maintaining acceptance of his work, Mr Moore said. He advised a middle ground where the expert works alone up to a certain point after which a committee can decide on final adjustments and acceptance.

Mr Terhune comments[1]: "My objection to Mr Moore's statement is that his expert is never really 'working alone.' He has working for him (or against him, if you wish) an invisible, informal committee consisting of the people to whom he will distribute his standard. If the standards he writes are not acceptable to the members of that committee they will rise up on their hind legs and tell him so in no uncertain terms.

"Actually, I can think of no important standard ever being developed outside of a committee. We are told that the English yard was established as the length of a certain king's arm. But I would be willing to gamble that the decision was made, not by the king, but by the Dimensional Standards Committee of the London Tailors Guild. They used the king's arm just to tie in a big name and obtain better acceptance of their standard."

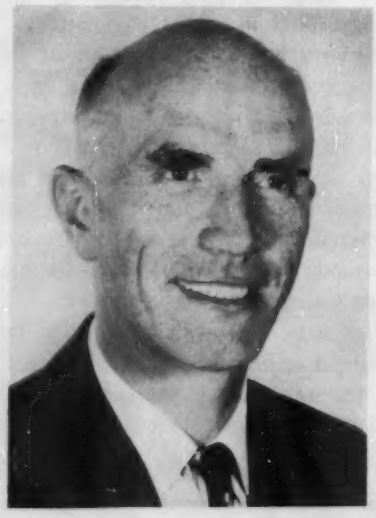
• With the bulb-planting season under way, gardeners will be interested in a new American Standard on Bulbs, Corms, and Tubers just approved by the American Standards Association.

The new standard specifies grades and sizes suitable: (1) for exhibition and forcing sizes; (2) for outdoor bedding purposes. The grades cover tulips, hyacinths, crocus, narcissus, and daffodils. The standard is an addendum to the American Standard for Nursery Stock, Z60.1-1952. Sponsor is the American Association of Nurserymen.

• A new special research committee of the American Association of Textile Chemists and Colorists—the Committee on End-Use Performance Tests—has been established by the Association to better correlate AATCC test methods with end-use performance, and to promote new tests or combinations of tests to predict end-use performance.

Charles A. Sylvester, head of the Dye Properties Division, Technical Laboratory, E. I. duPont de Nemours and Company, Incorporated, Wilmington, Delaware, has been appointed chairman of this new AATCC committee, which is a special committee of the Association's Executive Committee on Research.

Charles A. Sylvester



• Progress can be reported in the cause of standards and standardization in the Western Hemisphere. The Committee on International Relations of Engineers Joint Council, at its last meeting, recommended to EJC that it get behind the movement and work for the establishment of an active Pan American Committee on Technical Standards (CPNT). CPNT was formally set up at the Pan American Engineering Congress held in Brazil in 1949, but has not yet become a functioning organization. The activation of the committee was moved in resolutions adopted at the Convention of the Pan American Federation of Engineering Societies (UPADI) in New Orleans in 1952, and again at the UPADI Convention in São Paulo, Brazil, in 1954.

The Committee on International Relations suggested that the two organizations (UPADI and CPNT) work closely together, coordinate their interests, and establish their secretariats in the same location. The committee further advised that the United States member of CPNT would participate fully in the development of specific technical programs as soon as CPNT is a functioning organization, and urged that a meeting of CPNT be arranged in conjunction with the next convention of UPADI, which is scheduled for Mexico City in 1956.

Engineers Joint Council has approved the committee's recommendations in full with the understanding that "actions on interna-

[1] What Good Are Committees, H. R. Terhune, *Standards Engineering*, September 1955.

tional standards be taken through, or cleared with, the American Standards Association to insure proper coordination with current activities on standards on both the national and the international level."

The recommendations were the work of a subcommittee whose members include: Cyril Ainsworth, American Standards Association; Virgil M. Graham, Radio-Electronics-Television Manufacturers Association; Ellsworth F. Seaman, U.S. Navy, Bureau of Ships. Edmund A. Pratt, Consulting Engineer, is chairman.

• The first installment of a new comprehensive joint departmental manual governing uniform storage and materials handling methods and procedures for the Military Departments is now available.

The new publication, *Storage and Materials Handling Manual,* which is being jointly developed by the Military Services, establishes uniform mandatory methods and procedures governing all phases of military warehousing. The first installment covers the storage of lumber, split loads, and on-the-job training for operators of materials handling equipment.

Other sections of the Manual are in preparation and will be completed within the next few months. Chapter I contains a general introduction. Chapter II will cover storage space (including types of facilities, planning the storage layout, space requirement factors, design of stock location system, effective utilization, and space control and reporting). Chapter III will contain storage procedures covering receiving, shipping, stock location, stock fumigation, stock discrepancies, stock number changes, inventory, and care of supplies in storage.

Chapter IV of the manual will deal with materials handling equipment and principles including basic principles, selection of equipment, requirement factors, loading and unloading, and unit loads. Chapter V will contain procedures on the storage of special commodities including lumber, ammunition, vehicles, hazardous commodities, subsistence, miscellaneous commodities, and drummed petroleum products. Other chapters will include procedures on safety, storage management techniques, and on-the-job training.

• The Japanese Standards Association announces that it is celebrating its tenth anniversary in December of this year. A special issue of the association's publication "JIS" is being prepared.

• More than 90 scientists and engineers from the United States and abroad attended a Symposium on Precision Gage Blocks held at the National Bureau of Standards in Washington, D. C., August 11 and 12. Thirteen gage manufacturers were represented, as well as 10 gage-using firms, 10 U S Government agencies, and 2 foreign government agencies. The sessions were largely devoted to the technical problems that underlie more precise measurement of industrial gage blocks.

In addition to discussion periods, 16 invited papers were presented by representatives of the Physikalisch - Technische Bundesanstalt, National Research Council of Canada, E. I. duPont de Nemours Co, Engis Equipment Co, C. E. Johansson Gage Co, Moore Special Tool Co, Sandia Corporation, The Sheffield Corporation, The Timken Roller Bearing Co, and the National Bureau of Standards. The program was arranged by I. H. Fullmer, Chief of the Bureau's Engineering Metrology Section.

Control of dimensions in modern mass production depends upon the accuracy with which gage blocks can be measured and used as reference standards of length. In recent years the increasing demands of industry for more precise measurement have made necessary higher-quality gage blocks and more precise, accurate, and convenient methods for measuring them. As a result, improved interferometers have been designed which use wavelengths of light as length standards in absolute measurement and intercomparison of gage blocks. Improvements have also been made in the sensitivity and accuracy of mechanical comparators, both those which are entirely mechanical and those which employ electrical transducers, amplifying circuits, and current meters as the means of measurement. Several gage-measuring instruments of the different types, some developed commercially and others by or with the assistance of NBS, were exhibited in the Bureau's engineering metrology laboratories at one session of the symposium.

The symposium provided an opportunity for those interested in more precise gage block measurement to exchange ideas and to increase their understanding of the many problems encountered. A series of three papers dealt with the metallurgical and physical properties of gage block materials, with particular reference to dimensional stability. Another paper considered the characteristics of gage-block measuring surfaces, such as average roughness, depth of individual scratches, and condition of edges.

Six papers dealt with the application of interferometry to gage blocks, conditions affecting the accuracy of interferometric measurements, and the precision and accuracy attained in recent comparative length measurements by different laboratories. Two other papers were on recent improved interferometer designs.

The four concluding papers, as well as two formal discussions and an informal discussion period, were concerned with the development of commercial and government standards and specifications for gage blocks. Consideration was given to procedures for the surveillance of gage blocks after they have been in use.

Plans have been made for publishing all the symposium papers in a single volume.

AMERICAN STANDARDS

Status as of October 11, 1955

Legend

Standards Council—Approval of Standards Council is final approval as American Standard; usually requires 4 weeks.

Board of Review—Acts for Standards Council and gives final approval as American Standard; action usually requires 2 weeks.

Standard Boards—Approve standards to send to Standards Council or Board of Review for final action; approval by standards boards usually takes 4 weeks.

Building

American Standard Approved—

Building Code Requirements for Minimum Design Loads in Buildings and Other Structures, A58.1-1955 (Revision of A58.1-1945)
Sponsor: National Bureau of Standards

In Board of Review—

Support, Anchorage, and Protection of Exterior Marble Veneer 2 Inches and Less in Thickness, Specifications for, A94.2

Exterior Marble Used in Curtain Walls, Specifications for, A94.3
Sponsor: Marble Institute of America

In Standards Board—

Gypsum Lath, Specifications for, ASTM C37-50; ASA A67.1 (Revision of ASTM C37-50; ASA A67.1-1951)

Gypsum Sheathing Board, Specifications for, ASTM C79-52; ASA A68.1 (Revision of ASTM C79-52; ASA A68.1-1953)

Testing Gypsum and Gypsum Products, Methods of, ASTM C26-52; ASA A70.1-19 (Revision of ASTM C26-52; ASA A70.1-1953)

Gypsum Partition Tile or Block, Specifications for, ASTM C52-41; ASA A105.1 (Revision of ASTM C52-41; ASA A105.1-1954)
Sponsor: American Society for Testing Materials

Standard Submitted—

Standard Types of Building Construction, NFPA 220; ASA A110.1
Sponsor: National Fire Protection Association

Consumer Goods

New Project Requested—

Performance Requirements for Cleaning Supplies
Requested by: American Hotel Association

Electrical

American Standards Published—

Dimensional and Electrical Characteristics of 40-Watt T-12 Instant Start Fluorescent Lamp, C78.600-1955 (Revision of C78.600-1951) $.25

Dimensional and Electrical Characteristics of 48-inch T-12 Instant Start Single-Pin Hot-Cathode Fluorescent Lamp, C78.808-1955 (Revision of C78.808-1951) $.25

Dimensional and Electrical Characteristics of 72-Inch T-12 Instant Start Single-Pin Hot-Cathode Fluorescent Lamp, C78.808-1955 (Revision of C78.809-1951) $.25

Dimensional and Electrical Characteristics of 96-Inch T-12 Instant Start Single-Pin Hot-Cathode Fluorescent Lamp, C78.810-1955 (Revision of C78.810-1951) $.25
Sponsor: Electrical Standards Board

Ceramic Dielectric Capacitors Classes 1 and 2 (For Normal Commercial Applications in Noncritical Environments) C83.4-1955 (RETMA REC-107-A) $.40

Fixed Wire-Wound Resistors (Low Power in Nonmetallic Cases) (For Normal Commercial Applications in Noncritical Environments) C83.6-1955 (RETMA REC-117) $.30

Variable Control Resistors (Standard Tapers, Definitions, Shafts and Mountings) (For Normal Commercial Applications in Noncritical Environments) C83.7-1955 (RETMA REC-121-B) $.30

Forms, Dimensions, and Ratings of Panel Lamps (For Normal Commercial Applications in Noncritical Enviments) C83.8-1955 (RETMA REC-137) $.25
Sponsor: Radio-Electronics-Television Manufacturers Association

American Standard Approved—

Soft or Annealed Copper Wire, Specifications for, ASTM B3-53T; ASA C7.1-1955 (Revision of ASTM B3-53T; ASA C7.1-1953)

Conditioning Plastics and Electrical Insulating Materials for Testing, Methods of, ASTM D618-54; ASA C59.28-1955
Sponsor: American Society for Testing Materials

IES Guide for Electrical Measurements of Fluorescent Lamps, C78.375-1955

Dimensional and Electrical Characteristics of 72-Inch T-12 Instant-Start Single-Pin Hot-Cathode Fluorescent Lamp, C78.809-1955 (Revision of C78.809-1951)
Sponsor: Electrical Standards Board

In Board of Review—

Electric Railway Control Apparatus, C48 (Revision of C48-1931)
Sponsor: American Institute of Electrical Engineers

Synchronous Generators, Synchronous Motors, and Synchronous Machines in General, C50.1 (Partial revision of C50-1943)

Alternating-Current Induction Motors, Induction Machines in General and Universal Motors, C50.2 (Partial revision of C50-1943)

Direct-Current Generators, Direct-Current Motors, and Direct-Current Commutating Machines in General, C50.4 (Partial revision of C50-1943)

Rotating Exciters for Synchronous Machines, C50.5 (Partial revision of C50-1943)

Motor-Generator Sets, C50.6 (Partial revision of C50-1943)

Dimensions for Motors and Generators, C50.8 (Partial revision of C50-1943)
Sponsor: Electrical Standards Board

Testing Molded Materials Used for Electrical Insulation, Methods of, ASTM D48-54T; ASA C59.1-1955 (Revision of ASTM D48-52T; ASA C59.1-1954)

Testing Electrical Insulating Oils, Method of, ASTM D117-54T; ASA C59.2-1955 (Revision of ASTM D117-43; ASA C59.2-1944)

Test for Insulation Resistance of Electrical Insulating Materials, Methods of, ASTM D257-54T; ASA C59.3-1955 (Revision of ASTM D257-52T; ASA C59.3-1954)

Testing for Impact Resistance of Plastics and Electrical Insulating Materials, Methods of, ASTM D256-54T; C59.11-1955 (Revision of ASTM D256-47T; ASA C59.11-1948, R. 1954)
Sponsor: American Society for Testing Materials

Design, Construction and Operation of Class HI (High Impact) Shock-Testing Machine for Lightweight Equipment, Specification for, Z24.17
Sponsor: Acoustical Society of America

In Standards Board—

Terms for Audio Techniques, Definitions of, ASA C16.24 (54 IRE 3.51)

Television Signal Measurement Terms, Definitions of, C16.27 (55 IRE 23.S1)
Sponsor: Institute of Radio Engineers

Terms of Electron Tubes, Definitions of, C60.9

Terms of Magnetrons, Definitions of, C60.10

Terms of Gas-Filled Radiation Counter Tubes, Definitions of, C60.12
Sponsor: Joint Electron Tube Engineering Council

Graphic

American Standard Approved—

Graphical Symbols for Plumbing, Y32.4-1955 (Revision of Z32.2.2-1949)
Sponsors: American Institute of Electrical Engineers; American Society of Mechanical Engineers

In Standards Board—

Letter Symbols for Chemical Engineering, Y10.12 (Revision of Z10.12-1946)
Sponsor: American Society of Mechanical Engineers

Materials and Testing

American Standard Approved—

Nickel Seamless Pipe and Tubing, Specifications for, ASTM B161-49T; ASA H34.1-1955

Nickel-Copper Alloy Seamless Pipe and Tubing, Specifications for, ASTM B165-49T; ASA H34.2-1955

Nickel-Chromium-Iron Alloy Seamless Pipe and Tubing, ASTM B167-49T; ASA H34.3-1955
Sponsor: American Society for Testing Materials

Mechanical

American Standard Approved—

Code for Pressure Piping, B31.1-1955 Including Supplement No. 1, B31.1a-1953 (Revision of B31.1-1951) $3.50
Sponsor: American Society of Mechanical Engineers

Deep Well Vertical Turbine Pumps, Specifications for, B58.1-1955 $.50
Sponsor: American Water Works Association

American Standards Approved—

Small Solid Rivets, B18.1-1955 (Revision of B18.1-1953)

Sponsors: American Society of Mechanical Engineers; Society of Automotive Engineers

Scales for Use With Decimal-Inch Dimensioning, Z75.1-1955

In Standards Board—

Cast-Brass Solder-Joint Drainage Fittings, B16.23 (Revision of B16.23-1953)

Sponsors: American Society of Mechanical Engineers; Manufacturers Standardization Society of the Valve and Fittings Industry; Heating, Piping, and Air Conditioning Contractors National Association

New Project Initiated—

Plastic Pipe, B72

Sponsors: American Society of Mechanical Engineers; Society of the Plastics Industry

Reaffirmation Being Considered—

Reamers, B5.14 (Reaffirmation of B5.14-1949)

Sponsors: American Society of Mechanical Engineers; Metal Cutting Tool Institute; National Machine Tool Builders' Association; Society of Automotive Engineers

Medical

American Standard Published—

Dimensional for Glass and Metal Luer Tapers for Medical Applications, Z70.1-1955

Sponsor: Miscellaneous Standards Board

Mining

In Standards Board—

Recommended Practice for Drainage of Coal Mines, M6 (Revision of M6-1931)

Sponsor: American Mining Congress

Photography

In Standards Board—

Dimensions for Medical X-ray Sheet Film (Inch and Centimeter Sizes), PH1.17 (Revision of PH1.17-1953)

Sponsor: Photographic Standards Board

Dimensions for Professional Portrait and Commercial Sheet Film (Inch and Centimeter Sizes), PH1.18 (Revision of PH1.18-1953 and combination with Z38.1.29-1949)

Sponsor: Photographic Standards Board

Dimensions for 70-Millimeter Unperforated and Perforated Film for Cameras Other Than Motion Picture Cameras, PH1.20 (Revision of Z38.1.3-1948)

Dimensions for Amateur Roll Film, Spool, and Backing Paper No. 828, PH1.21a (Supplement to Z38.1.7-1950)

Method for the Sensitometry of Industrial X-ray Films for Energies up to 2 Million Electron Volts, PH2.8

Method for the Sensitometry of Medical X-ray Films, PH2.9

Focal Length of Lenses: Markings, PH3.13 (Revision of Z38.4.4-1942)

Photographic Thermometers, PH4.7 (Revision of Z38.8.11-1948)

Photographic Graduates, PH4.9 (Revision of Z38.8.12-1948)

X-ray Sheet Film Hangers (Clip-Type), PH4.18 (Revision of Z38.8.23-1949)

Internal Dimensions for Deep Tanks for Manual Processing of Amateur Roll Film, PH4.19 (Revision of Z38.8.8-1946)

Channel-Type Multiple Photographic Hangers (Plates and Sheet Film), PH4.22

Specification for Photographic Grade Sodium Citrate, PH4.179

Sponsor: Photographic Standards Board

Reaffirmation Being Considered—

Sound Focusing Test Film for 35mm Motion Picture Sound Reproducers (Service Type), PH22.61 (Reaffirmation of Z22.61-1949)

Buzz-Track Test Film for 35mm Motion Picture Sound Reproducers, PH22.68 (Reaffirmation of Z22.68-1949)

Requested by: Society of Motion Picture and Television Engineers

Safety

In Board of Review—

Prevention of Dust Explosions in Flour and Feed Mills, Code for, Z12.3 (Revision of Z12.3-1953)

Prevention of Dust Explosions in Terminal Grain Elevators, Code for, Z12.4 (Revision of Z12.4-1953)

Prevention of Dust Ignitions in Country Grain Elevators, Code for, Z12.13-1953

Sponsor: National Fire Protection Association

New Project Requested—

Auto Seat Safety Belts

Requested by: Association of Casualty and Surety Companies, Accident Prevention Department, Industrial Safety Equipment Association

Safety Code for Lawn Mowers

Requested by: Lawn Mower Institute

Safety Codes for Nuclear Reactors, Accelerators, and Other Related Subjects

Requested by: American Society of Mechanical Engineers

WHAT'S NEW ON AMERICAN STANDARD PROJECTS

Dimensional Standardization of Bolts, Nuts, Rivets, Screws, and Similar Fasteners, B18—

Sponsors: Society of Automotive Engineers; The American Society of Mechanical Engineers.

A proposed standard on Slotted and Recessed Head Tapping Screws and Metallic-Drive Screws, B18.6.4, is being circulated for comment. General and dimensional data for the types of screws recognized as American Standard are included. Appendices provide formulas on which the dimensional data are based as well as specifications and instructions for protrusion gaging of flat heads and penetration gaging of recessed heads.

Copies of the proposed standard can be obtained without charge from The American Society of Mechanical Engineers, 29 West 39th Street, New York 18, New York.

Code for Pressure Piping, B31—

Sponsor: The American Society of Mechanical Engineers

Submitted by the Sponsor

From time to time certain actions of Sectional Committee B31 will be published for the information of interested parties. While these do not constitute formal revision of the Code, they may be utilized in specifications, or otherwise, as representing the considered opinion of the committee.

Pending revision of the Code for Pressure Piping, ASA B31.1-1955, the sectional committee has recommended that selected interpretations be published so that industry may take immediate advantage of corresponding proposed revisions. The following cases are published herewith as interim actions of Sectional Committee B31 on the Code for Pressure Piping that will not constitute a part of the Code until formal action has been taken by the ASME and by the American Standards Association on a revision of the Code.

Case No. 18

Inquiry: Is it permissible to use mechanical joints in cast-iron piping covered by Section 3 on Refinery Piping Systems of the Code for Pressure Piping?

Reply: It is the opinion of the committee that mechanical joints in accordance with American Standard A21.11, Specifications for a Me-

chanical Joint for Cast Iron Pressure Pipe and Fittings, and the standards of the Cast-Iron Pipe Research Association covering cast-iron mechanical joints may be used in cast-iron piping covered by Section 3 until such time as the Code is revised accordingly.

Case No. 19

Inquiry: Is it permissible to use cast-iron pressure pipe in accordance with ASTM Specification A377, Specification for Cast Iron Pressure Pipe, for cast-iron piping covered by Section 3 on Refinery Piping Systems of the Code for Pressure Piping?

Reply: It is the opinion of the committee that, in view of the cancellation of ASTM Specification A44, cast-iron pipe in accordance with ASTM Specification A377, Specifications for Cast Iron Pressure Pipe, may be used in cast-iron piping covered by Section 3 until such time as the Code is revised accordingly.

The applicable American Standards as stipulated by A377 are:

A21.2 Cast Iron Pit Cast Pipe for Water or Other Liquids
A21.3 Cast Iron Pit Cast Pipe for Gas
A21.4 Cement Mortar Lining for Cast Iron Pipe and Fittings
A21.6 Cast Iron Pipe Centrifugally Cast in Metal Molds for Water or Other Liquids
A21.7 Cast Iron Pipe Centrifugally Cast in Metal Molds for Gas
A21.8 Cast Iron Pipe Centrifugally Cast in Sand-Lined Molds for Water and Other Liquids
A21.9 Cast Iron Pipe Centrifugally Cast in Sand-Lined Molds for Gas

Case No. 20

Inquiry: May electric-fusion-welded austenitic stainless steel pipe conforming to ASTM Specification A358 Electric-Fusion-Welded Austenitic Chromium - Nickel Alloy Steel Pipe for High Temperature Service be used under Section 3 on Refinery Piping Systems of the Code for Pressure Piping?

Reply: It is the opinion of the committee that electric-fusion-welded austenitic stainless steel pipe complying with the requirements of ASTM Specification A358 may be used provided the following requirements are met:

(*a*) The joint efficiency shall be 85 percent for material supplied in accordance with the specification.

(*b*) The joint efficiency shall be 100 percent for piping in which the longitudinal welds are 100 percent radiographed.

(*c*) The heat treatment shall be a matter of agreement between the purchaser and the vendor based on the intended service.

(*d*) Stresses shall conform to A312 with the appropriate joint efficiency factor.

(*e*) Radiographed in conformance with requirements of 635(b)(2).

Case No. 21

Inquiry: May seamless steel pipe having 70,000 psi minimum tensile strength be used in the construction of piping under the rules of Section 1 of this Code?

Reply: It is the opinion of the committee that carbon steel seamless pipe having 70,000 psi minimum tensile strength may be used for Code construction under Section 1. The pipe shall be manufactured in compliance with the requirements of ASTM Specification A-106, Seamless Carbon-Steel Pipe for High-Temperature Service, with the following modifications:

(*a*) The carbon content shall not exceed 0.32 percent by ladle analysis or 0.35 percent by check analysis. Other chemical elements shall be as listed for A-106 Grade B.

(*b*) The physical properties shall meet the following minimum requirements:

Tensile strength, psi	70,000
Yield point, psi	40,000
Elongation in 2 in. in the longitudinal direction of a standard round 2 in. gage length	20% min

(*c*) The flattening test shall be as required for A-106 Grade B.

(*d*) The grade designation for marking shall be "70,000 T.S. A-106 Grade C."

(*e*) The maximum allowable stresses are:

—20 to 650F	17,500 psi
700F	16,600 psi
750F	14,750 psi
800F	12,000 psi

Centrifugal Pumps for Chemical Industry Use, B73—

Sponsors: The Manufacturing Chemists' Association; The Hydraulic Institute.

Subcommittees were set up at the committee's organizational meeting, September 28. The scope of the committee's work covers: "The development of standards for horizontal, and suction, single-stage centrifugal pumps, including base plates, suitable for use in the chemical industry, having an approximate capacity range of 5 to 1000 gallons per minute, for temperatures to 500 F, with discharge heads not exceeding that allowed by American Standard 150-lb (steel) flange, and may include any suitable material of construction. Consideration may include such items as dimensional interchangeability; features desirable to minimize maintenance, operating and replacement costs; uniform lettering for like dimensions; uniform nomenclature and definitions." James Williamson, The Duriron Company, Incorporated, was appointed chairman of Subcommittee 1. This subcommittee will have the responsibility for: (*a*) developing boundary dimensions for chemical pumps; (*b*) developing an optimum number of pump standards to cover the range of 5 to 1000 gallons per minute; (*c*) considering standard arrangements and standard base plates; (*d*) establishing design standards for shaft sizes.

Subcommittee 2 will have the responsibility for establishing uniform dimensions in the stuffing box area. The subcommittee chairman will be appointed later.

W. G. Canham, Monsanto Chemical Company, has been named chairman of Subcommittee 3. This subcommittee will develop a list of essential and desirable features for a standard chemical pump.

Theodore Davenport of Worthington Corporation is chairman of Subcommitte 4, which will develop uniform definitions, nomenclature, and letter designations for centrifugal pumps and component parts.

The next meeting of Sectional Committee B73 is scheduled for January 18, 1956, at American Standards Association headquarters. The subcommittees plan to have reports available for discussion at that meeting.

J. R. Boyer, E. I. duPont de Nemours and Company, Wilmington, Delaware, is chairman of Sectional Committee B73, and M. L. Murdock, Allis-Chalmers Manufacturing Company, Cincinnati, Ohio, is vice-

chairman. Secretary of the committee is Maurice F. Crass, Jr, Secretary-Treasurer, Manufacturing Chemists' Association.

Howard B. Noyes

Gas Burning Appliances, Z21—

Sponsor: American Gas Association.

Howard B. Noyes, Senior Vice-President of Washington Gas Light Company, has been elected chairman by Sectional Committee Z21. Mr Noyes is a member of the Advisory Council of the American Gas Association and of the AGA Laboratories Managing Committee. He is also a member of the Managing Commitee of AGA's General Management Section. Mr Noyes represents the American Gas Association on the Standards Council of the American Standards Association.

Cleaning and Maintenance

A project to establish performance requirements for cleaning and maintenance materials applicable to 19 end-uses was requested at a general conference called by the American Standards Association October 6.

The conference was held at the request of the American Hotel Association, and was attended by manufacturers of cleaning materials, manufacturers of products on which cleaning is performed, government and health agencies, consumer groups, and trade associations.

The conference recommended that the American Hotel Association be asked to furnish administrative leadership as sponsor of the proposed new project.

STANDARDS OUTLOOK

by LEO B. MOORE

Automation

The great stir in the industrial world is the more extensive application of mechanization to our productive processes. Even the word "automation" has caught the popular fancy, and the possibilities of electronic equipment in the office and in the plant have fired the imagination. To the business executive, however, the problems in this area are complex. One man upon whom he must depend to make an essential contribution to these decisions is the standards engineer.

Automation is not new either in principle or in practice. Every company develops some automation in the normal course of production improvement. Many plants have been using automation for years. For example, most chemical and food producers because of the nature of their process take in the raw material and, through a connected series of operating and handling equipment, deliver the finished products to storage awaiting shipment. The question of whether similar principles of mechanization can be extended to other businesses is the problem of automation.

One of the basic conditions for profitable automation is high volume of product. Whenever a business has a high product demand, it is able to invest an increasing amount of engineering talent and special equipment in the manufacturing and handling process. The large volume will support the tremendous investment of time and money by effecting reductions in unit costs of production with consequent increases in profit.

Volume alone, however, is not enough to support automation. The volume must be of a standardized product. A high volume of a large variety of similar products where that variety is produced by different processes, tools, and treatments prohibits automation. The product—its design, its materials, its specifications, its fabrication, and its handling—must be completely within the control of the manufacturer and subject to no radical change until the large volume is produced. In addition, there must be no interruptions or variations in the supply of materials, of power, of labor, of money, and of every other supporting force to the main production line.

If a manufacturer desires to make greater use of automation than he now does, he must put into motion several programs at once with one of these in the standards area. He must have his standards engineers make a particular effort to standardize products—components—parts, processes—equipment—tools—materials. He must simplify his product line to eliminate variety and thereby increase the demand for the remainder. He must convince his market that this standard product in terms of its standard of performance and quality is indeed a competitive value. Through these efforts he may raise the volume to the point of justifying the necessary investment.

The first key that unlocks the door to automation is clearly in the hands of the standards engineer.

•

Mr Moore is Assistant Professor of Industrial Management at Massachusetts Institute of Technology where he teaches a full-term course in industrial standardization.

A new edition of the American Standard system for the design of straight bevel gears has just been published. Originally developed in 1922 and revised in 1940, the American Standard system has been brought up to date in this 1955 edition, prepared by ASA Sectional Committee on Standardization of Gears, B6, with the cooperation and approval of the AGMA Bevel Gearing Committee. Sponsors of Committee B6: American Gear Manufacturers Association; The American Society of Mechanical Engineers. This new American Standard offers

The Latest on GEARS

AMERICAN STANDARD SYSTEM FOR STRAIGHT BEVEL GEARS

AGMA 208.01; ASA B6.13-1955
(Revision of 1940 edition)
$1.00

Recommends

Tooth proportions and dimensions of blanks for generated straight bevel gears of tooth ratios in general industrial use. Tables list: Numbers of teeth; gear addendum for 1 diametral pitch; recommended backlash for gears assembled to run; ratios that can be cut with 14½-deg pressure angle without undercut; straight bevel gear dimensions. (Tables giving tooth data and machine settings are also available.)

Changes

Clearance and whole depth of teeth increased slightly.
Proportional tooth thicknesses of pinion and gear changed somewhat for approximately equal strength—determined by improved methods of analysis and design.
Pressure angle now 20 deg instead of 14½ deg.

Other American Standards on Gears

Spur-Gear Tooth Form, B6.1-1932	$ .55
Letter Symbols for Gear Engineering, B6.5-1954	1.00
Gear Tolerances and Inspection, B6.6-1946	.80
20-Deg Involute Fine-Pitch System for Spur and Helical Gears, B6.7-1950	1.50
Fine-Pitch Straight Bevel Gears, B6.8-1950	1.00
Design for Fine Pitch Worm Gearing, B6.9-1950	1.50
Gear Nomenclature—Terms, Definitions, and Illustrations, B6.10-1954	1.50
Inspection of Fine-Pitch Gears, B6.11-1951	2.50
Nomenclature of Gear Tooth Wear and Failure, B6.12-1954	1.50

American Standards Association
70 East 45 Street
New York 17